



EPA's 33/50 Program Sixth Progress Update

Continuing Progress Toward Ultimate Reduction Goal





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INTRODUCTION

The 33/50 Program, an EPA voluntary pollution prevention initiative, derives its name from its overall goals—an interim goal of a 33% reduction in 1992 and an ultimate goal of a 50% reduction in 1995 in releases and transfers of 17 high-priority toxic chemicals (see Box 1), using 1988 TRI reporting as a baseline. During 1988, 1.49 billion pounds of the target chemicals were either released to the environment on-site or transferred off-site to waste management facilities. The aim of the 33/50 Program is to reduce this amount by at least 50%—744 million pounds—by 1995, with an interim reduction target of more than 491 million pounds by 1992.

The 33/50 Program represents an innovative experiment aimed at demonstrating whether voluntary programs can augment the Agency's traditional command-and-control approach by achieving targeted reductions more quickly than regulations alone. The Program is part of a broad group of EPA activities designed to encourage pollution prevention as the best means of achieving reductions in toxic chemical releases and transfers. More than 19,000 TRI facilities have reported 33/50 Program chemicals to TRI since 1988. By contacting the chief executives of the parent companies of TRI facilities that report 33/50 Program chemicals, the Program seeks to instill a pollution prevention ethic throughout the highest echelons of American businesses.

At the time the 33/50 Program was formulated, 1988 was the most recent year for which TRI data were available, and the Program's baseline and goals were set accordingly. Reductions that companies achieved between 1988 and 1990 therefore contribute to the 33/50 Program's national reduction goals. However, these prior reductions should not be viewed as resulting from the 33/50 Program, as companies were first informed about the Program in February, 1991.

Many states, a number of industry associations, and numerous individual companies include 33/50 Program chemicals within the scope of their own environmental initiatives. Twenty-six states had established toxics use reduction and pollution prevention programs prior to establishment of the 33/50 Program, and these contributed to its design. Others have used the 33/50 Program as a model. EPA views the 33/50 Program as an umbrella under which the federal government, states, industry, and communities work in partnership to achieve common goals. Any progress in reducing releases and transfers of 33/50 Program chemicals reflects the efforts of all these partners.

Analyses of 33/50 Program progress consider only those data elements facilities were required to report in 1988: environmental releases and transfers off-site for treatment and disposal (including transfers to POTWs and transfers with missing or invalid transfer codes).



17 Priority Chemicals Targeted by the 33/50 Program

Benzene
Cadmium and compounds
Carbon tetrachloride
Chloroform
Chromium and compounds
Cyanide compounds
Dichloromethane
Lead and compounds
Mercury and compounds
Methyl ethyl ketone
Methyl isobutyl ketone
Nickel and compounds
Tetrachloroethylene
Toluene
1,1,1-Trichloroethane
Trichloroethylene
Xylenes

Box 1. 33/50 Program Chemicals.

Transfers off-site for energy recovery and for recycling are not included in 33/50 Program goals.

SUMMARY OF FINDINGS

Findings revealed in the 1993 TRI reporting data are summarized below. The data themselves are presented in subsequent sections.

33/50 Program Chemicals Continue Trend Toward Early Achievement of 1995 Reduction Goal

- Releases and transfers of 33/50 Program chemicals were reduced by 100 million pounds (11%) between 1992 and 1993, bringing total reductions since 1988 to 46% (685 million pounds), just shy of the Program's 1995 50% reduction goal (see Figure 1).

- Facilities are projecting continued reductions in their releases and transfers of 33/50 Program chemicals in 1994 and 1995, suggesting that the Program's ultimate reduction goal of 744 million pounds may be achieved a year ahead of schedule.
- Facilities owned by companies participating in the 33/50 Program reported the highest reduction levels and accounted for most of the pounds of 33/50 Program chemical reductions.
- Between 1992 and 1993, facilities owned by Program participants reduced releases and transfers of the 17 Program chemicals by 20%. The rate of reduction achieved by facilities owned by non-participating companies was just 0.6%.

- Participating companies accounted for 98% of the reduction in 33/50 Program chemical releases and transfers in the last year. Since 1988, facilities owned by participating companies have cut releases and transfers of 33/50 Program chemicals 57%.

Total 33/50 Program Chemical Production-Related Waste Projected to Decline

- Total production-related waste associated with 33/50 Program chemicals increased slightly (2.9%) between 1992 and 1993, but is projected to decline by nearly 6% in 1994, while facilities expect other TRI chemical waste to continue increasing (see Figure 2).
- Facilities owned by 33/50 Program participating companies reported a slight decrease in production-related waste (0.5%) while facilities owned by non-participating parent companies reported an 8% increase.

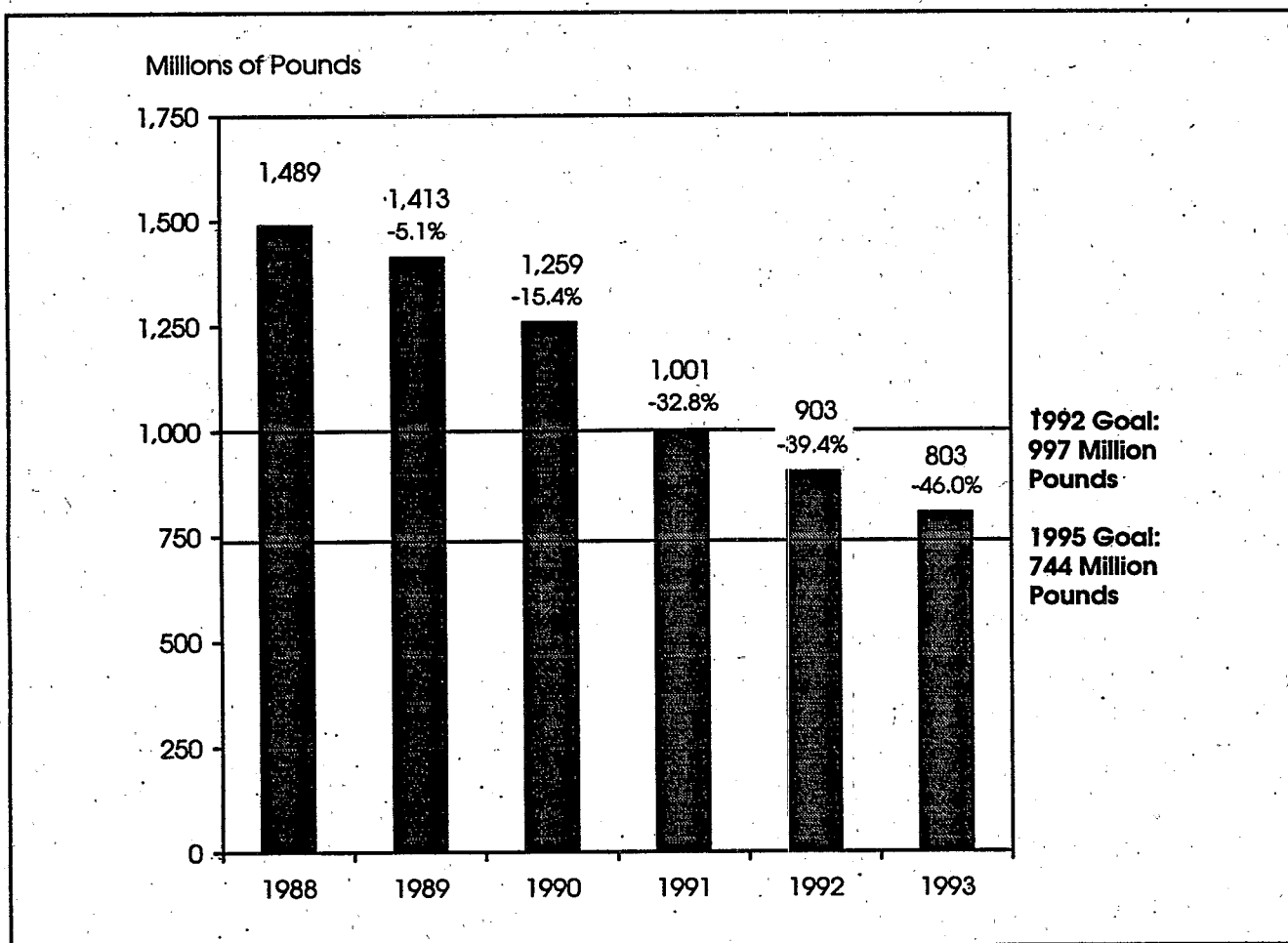


Figure 1. TRI Releases and Transfers of 33/50 Program Chemicals, 1988-1993.^①

- Participating companies' facilities project a 15% decrease in production-related waste of 33/50 chemicals by 1995, compared to a 7% increase projected by non-participants.

Source Reduction Activity Highlights

- 33/50 Program chemicals again in 1993 evidenced higher rates (percentages of Form Rs) and levels (total number of Form Rs) of source reduction activity reporting than other TRI chemicals. Nearly a third of the Form Rs submitted for 33/50 Program chemicals reported the occurrence of a source reduction activity in 1993, compared to a fifth of the forms for other TRI chemicals. The 7,639 source reduction activity reports for the 17 target chemicals represented nearly 40% of the total for all chemicals.
- Individual 33/50 Program chemicals had some of the highest rates of source reduction activity reporting in 1993. The top three TRI chemicals for number of forms reporting source reduction activities in 1993 were 33/50 Program targets, and several others are among the top 30.

^① The amounts for transfers to recycling and energy recovery reported for 1991-1993 have not been included in these totals.



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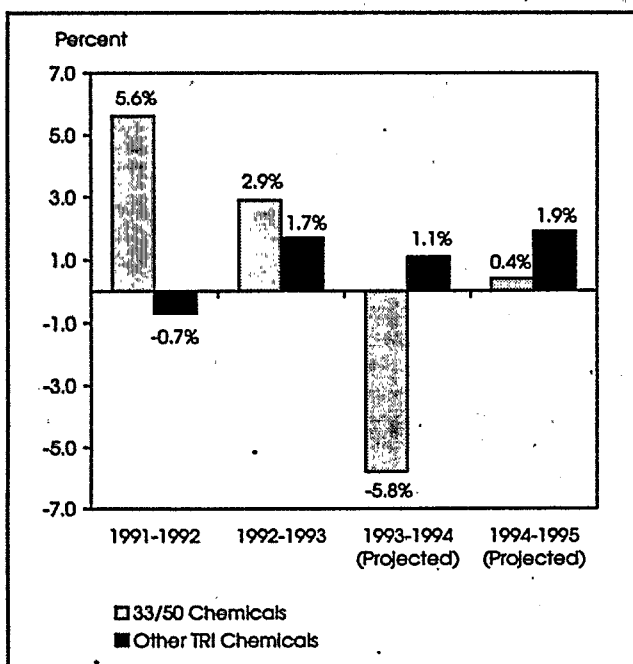


Figure 2. Percent Change in Total Production Related Wastes, 33/50 Chemicals vs. Other TRI Chemicals, 1991-1995.②

COMPANY PARTICIPATION IN THE 33/50 PROGRAM

While the 33/50 Program does not have a fixed goal for the number of companies electing to participate, the Program nonetheless has placed considerable emphasis on outreach to companies in an effort to promote a pollution prevention ethic as widely as possible.

Numbers of Companies Participating

Initial communications about the 33/50 Program have been directed to the chief executive officers of the parent companies of the more than 18,600 industrial facilities that have reported to TRI any of the Program's 17 target chemicals from 1988 to 1991. At the close of the Program's fourth year in February 1995, almost 8,000 companies had been contacted by EPA with invitations to participate. Of these, 1,272 companies have elected to enroll.

② 1991 as reported on the 1992 Form R for the previous year.

Releases and transfers reported by facilities belonging to these companies represent 63% of the 1988 releases and transfers of 33/50 Program chemicals. Participants have pledged to reduce voluntarily 368 million pounds of pollution (see Figure 3).

The "Top 600" companies with the greatest amounts of releases and transfers were the first to be contacted and have been the focus of greater outreach follow-up from the Program's headquarters and Regional Office staffs. This concentration on larger companies has proven quite effective, with more than 60% of these companies electing to participate. However, less than 13% of the nearly 7,500 smaller companies contacted by EPA since 1991 have chosen to enroll.

The 33/50 Program continues to accept new company participants, although efforts to actively solicit participation ended in 1994. While the Program's national goals are targeted for achievement by the end of 1995, companies are encouraged to set their own reduction goals oriented to their own time frames. Program participants have also targeted reductions for after 1995, for other chemicals besides the Program's 17 target chemicals, and for facilities outside of the United States. Altogether, 33% of participating parent companies have made at least one of these types of extended pledges. The 33/50 Program seeks to instill among its participants a commitment to continuous environmental improvement, not to confine company initiatives within the boundaries of the Program's national goals.

Reductions Pledged by Participating Companies

Nearly 1,000 (78%) of the 1,272 participating companies have provided release/transfer reduction targets for the 33/50 Program totalling

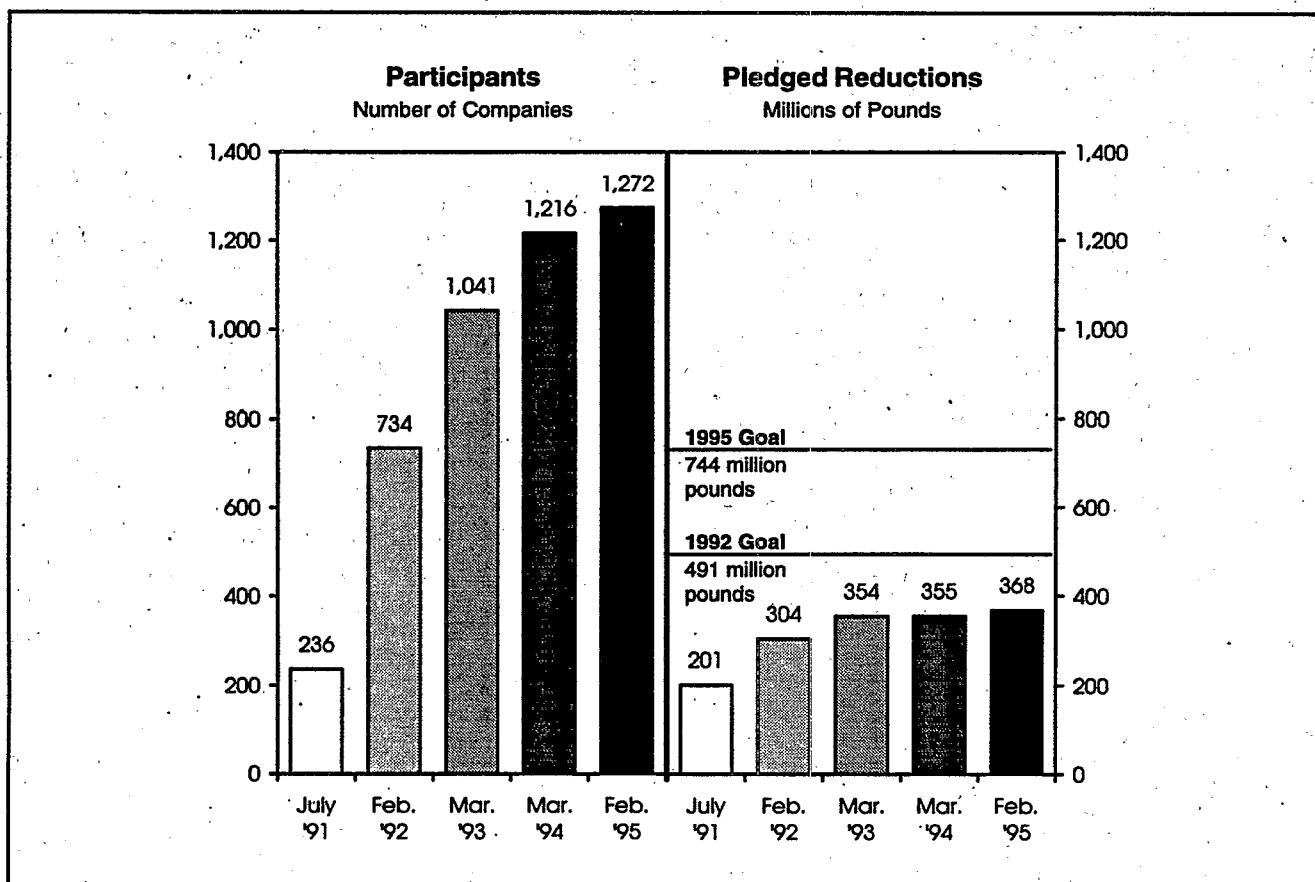


Figure 3. 33/50 Program Participant Status, February 1995.

368 million pounds. Those companies using a baseline of 1988 accounted for 53% of the releases and transfers reported by all Program participants in that year, and their reduction commitment represents slightly less than 50% per company.

Many of the remaining Program participants have also developed reduction targets, but have structured them in ways that are difficult to assess against the 1988 release/transfer baseline. For example, some companies have reduction goals that are indexed to changes in production. If production remains constant throughout the duration of the Program, these can be read as direct reductions targets. However, where production increases or decreases, the absolute impact of the company's reduction pledge can not be determined in advance. Accordingly,

EPA has not factored these commitments into its assessment of total release/transfer reductions anticipated to be obtained through the 33/50 Program.

Other Program participants have developed reduction goals that go beyond the goals of the 33/50 Program. Some have pledged to reduce all TRI releases and transfers by specified amounts or percentages, but have not indicated specific targets for 33/50 Program chemicals. Others have gone beyond targeting end-of-pipe releases or transfers by attempting to reduce their actual use of toxic chemicals, but have not stipulated the impact such pollution prevention initiatives will have on environmental releases of 33/50 Program chemicals. As a result, the 368 million pounds of release/transfer



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reductions represent a lower bound on the reductions that companies are attempting under the 33/50 Program.

Actual Reductions Out-Pacing Pledges

As evidenced in the TRI reporting data, actual reductions being achieved by companies for the Program's 17 target chemicals are exceeding significantly EPA's conservative interpretation of companies' reduction pledges. The 685 million pounds of 33/50 Program chemical releases and transfers reduced between 1988 and 1993 is nearly twice the 368 million pounds pledged by participating companies to be reduced by 1995.

Some of these additional reductions result from decreases being achieved by companies that are not participating in the 33/50 Program [about 151 million pounds (22%) through 1993]. Some are due to the efforts of participating companies whose reduction pledges could not be factored into the national total. Significantly, however, companies that have made reduction pledges are achieving greater results than even they anticipated.

33/50 PROGRAM RELEASES AND TRANSFERS

Releases and transfers of 33/50 Program chemicals were reduced by 11% in 1993, a slightly greater reduction than observed in 1992 (9.8%). As indicated in Figure 1, the 100 million pound reduction in releases and transfers of the Program's 17 target chemicals between

1992 and 1993 brings total 33/50 Program reductions since 1988 to 686 million pounds (46%), just shy of the Program's 1995 ultimate 50% reduction goal of 744 million pounds.

Facilities are projecting continued reductions in 33/50 Program emissions in 1994 and 1995. While facilities do not provide projections of the releases and transfers they report in Sections 5 and 6 of Form R, which are used to measure 33/50 Program progress, projections are reported for the quantities of TRI chemicals managed in waste in Section 8 of Form R. (See the following section, 33/50 Program Chemicals in Waste, for a complete description of Section 8 reporting requirements.) Adding Section 8 projections for releases (which include off-site transfers to disposal) to Section 8 projections for quantities sent for off-site treatment provides a reasonable proxy for future facility reporting (in Sections 5 and 6) of on-site releases and off-site transfers to treatment and disposal. However, these calculations do not provide an exact match: Section 8 calculations using 1993 prior year reporting for 1992 understate facilities' actual release/transfer reports for 1992 by 7.5%, while for 1993, the Section 8 calculations overstate Section 5 and 6 reporting by 1.8%.

Facilities project 33/50 Program chemicals-in-waste releases and transfers to treatment to decline by 15.5% in 1994 and another 6.9% in 1995. These projections offer strong encouragement that the 33/50 Program's 1995 ultimate 50% reduction goal indeed will be achieved, perhaps even a year ahead of schedule.



33/50 Program Chemical Reductions versus Reductions for Other TRI Chemicals

Table 1 presents facilities' reports of on-site releases and off-site transfers to treatment and disposal of 33/50 Program chemicals versus reports for all other TRI chemicals for 1988 (the 33/50 Program's base year), 1990 (the year prior to EPA's initiation of the Program), 1992, and 1993. In order to control for changes in the TRI chemical list over time, year-to-year comparisons for non-33/50 Program chemicals (labelled "TRI Chemicals Less 33/50 Chemicals") are based on a consistent list of chemicals that have been reported under TRI for all years 1988-1993. The trends in reductions for each grouping of chemicals are depicted in Figure 4.

Figure 5 highlights the dramatic change in the reduction trends for 33/50 Program chemicals versus other TRI chemicals that began in 1991, the year that the 33/50 Program was initiated, and continued in 1992, the Program's second

year. In the two years prior to the Program's announcement, reductions in releases and off-site transfers of other TRI chemicals significantly out-paced those for 33/50 Program chemicals: 24.2% vs. 15.4%. However, in the first two years after 33/50's voluntary reduction goals were announced, releases and transfers of its 17 target chemicals were reduced at nearly three times the rate observed for all other TRI chemicals: a 28.3% reduction between 1990 and 1992 for 33/50 Program chemicals versus a 10.3% reduction for the remaining TRI chemicals.

Interestingly, non-33/50 Program chemical release/transfer reductions caught up with and slightly surpassed those achieved for the 17 Program chemicals in 1993. Other TRI chemical releases and transfers dropped by 13.1% in 1993, compared to the 11% decline for 33/50 Program chemicals. This is the first time since the 33/50 Program commenced that reductions for non-Program chemicals exceeded those observed for the Program's 17 target chemicals. This change in the reduction pattern

Table 1. Releases and Transfers of 33/50 Program Chemicals Compared to Other TRI Chemicals, 1988, 1990, 1992-1993.③

	All TRI Chemicals (Excluding Additions/ Deletions)	TRI Chemicals Less 33/50 Chemicals	33/50 Chemicals Only
	Pounds	Pounds	Pounds
1988	6,488,962,564	5,000,199,508	1,488,763,056
1990	5,047,042,788	3,788,023,022	1,259,019,766
1992	4,299,247,742	3,396,602,596	902,645,146
1993	3,754,621,658	2,951,312,798	803,308,860
	Percent Change	Percent Change	Percent Change
1988-1990	-22.22%	-24.24%	-15.43%
1990-1993	-25.61%	-22.09%	-36.20%
1992-1993	-12.67%	-13.11%	-11.01%
1988-1993	-42.14%	-40.98%	-46.04%

③ The amounts for recycling and energy recovery reported for 1991-1993 have not been included in these totals.



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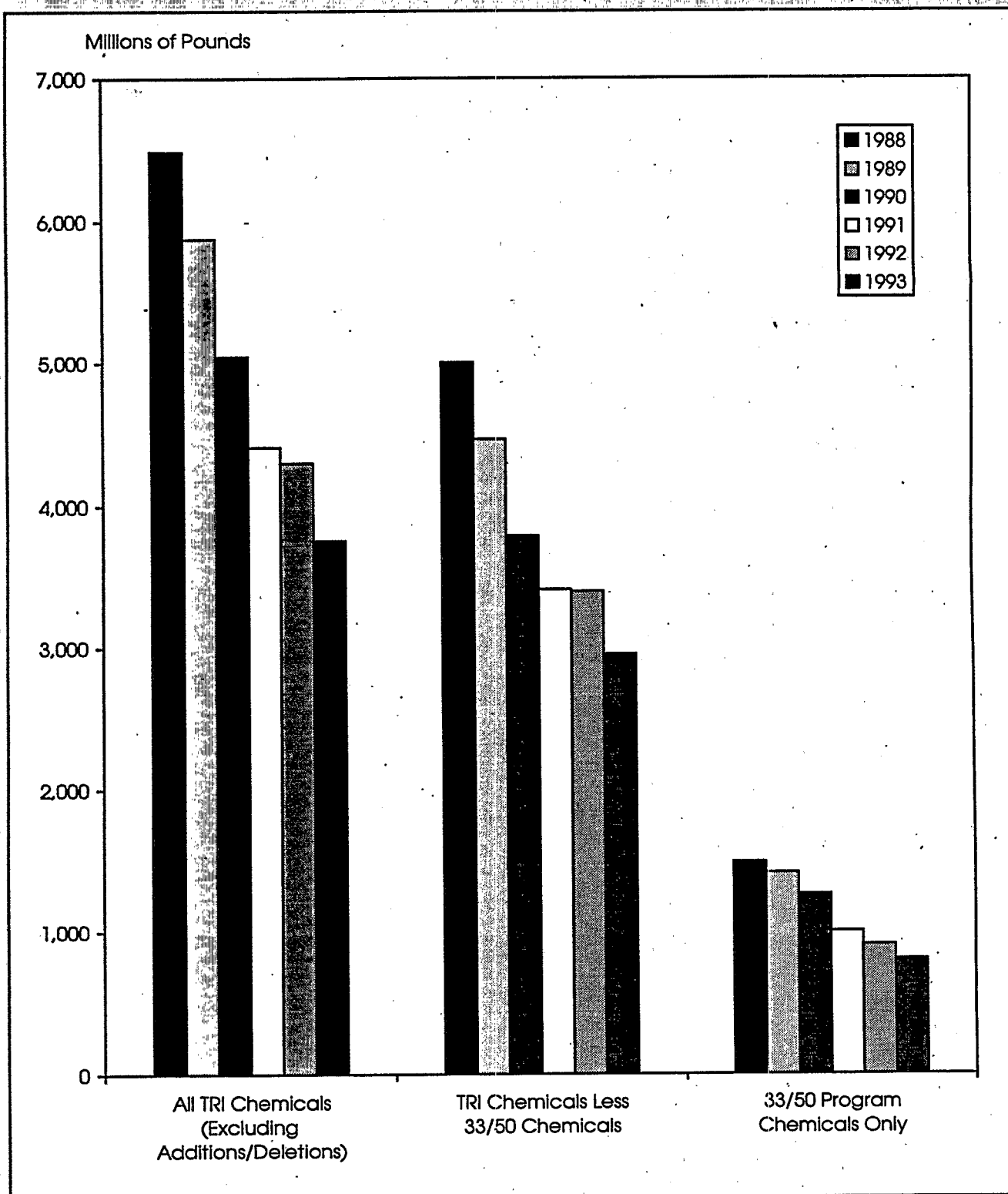


Figure 4. Releases and Transfers of 33/50 Program Chemicals Compared to Other TRI Chemicals, 1988-1993.

④ The amounts for transfers to recycling and energy recovery reported for 1991-1993 have not been included in these totals.

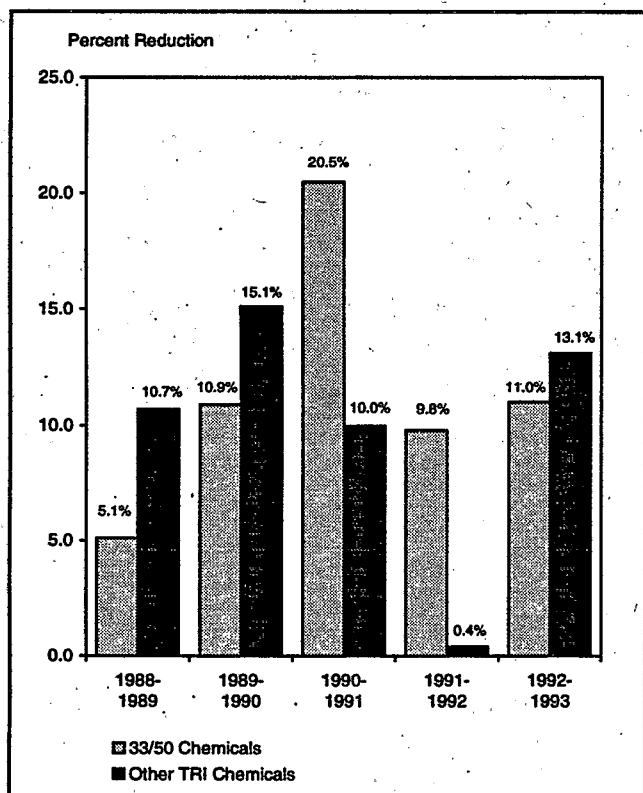


Figure 5. Year-to-Year Reduction Comparisons: Releases and Transfers of 33/50 Program Chemicals vs. Other TRI Chemicals, 1988-1993.⁵

occurred even though 33/50 Program chemical release/transfer reductions were greater in 1993 than in 1992, and is explained in part by a significant drop in underground injection of TRI chemicals that occurred in 1993. Since underground injection is utilized only marginally for 33/50 Program chemicals (see next section), these reductions had a disproportionate impact on non-33/50 Program chemicals.

In the 33/50 Program's first two years (1991 and 1992), reductions in the 17 Program chemicals almost equalled those of the remaining 300-plus TRI chemicals in actual pounds: the 356 million pounds of reductions for 33/50 Program

chemicals is just 9.0% less than the 391 million pound drop for non-Program chemicals. In 1993, however, absolute reductions for other TRI chemicals (445 million pounds) were more than four times greater than the 100 million pound decline for the Program's 17 target chemicals.

The "leaders-in-reductions" rôle being played by 33/50 Program participants is also reflected in the reduction performance of the individual TRI facilities that use the target chemicals. Five of the top 10 facilities showing the greatest reductions in direct environmental releases between 1992 and 1993 (excluding underground injection), and 15 of the top 20, report 33/50 Program chemicals and are owned by companies that are participating in the Program. Of the top 50 reducing facilities, 38 report Program chemicals and are owned by participating parents.

33/50 Program Chemical Releases and Transfers, by Medium/Transfer Type and by Chemical

Releases and off-site transfers of 33/50 Program chemicals are summarized by chemical and release medium/transfer type for the period 1988 to 1993 in Table 2. (Box 2 explains the presentation of 33/50 chemicals in these tables.) The "Subtotal" column in the transfers portion of the table represents those transfer types (POTWs, treatment, disposal, and "other" transfers) that are included in the 33/50 Program goals. The "Total" column adds in transfers for recycling and energy recovery, which have been reportable to TRI since 1991 but are not included in the 33/50 Program. Figure 6 presents a graphical representation of the total releases and transfers for each chemical for these years.

⁵ The amounts for recycling and energy recovery reported for 1991-1993 have not been included in these totals.



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Table 2. TRI Releases and Transfers of 33/50 Program Chemicals, 1988, 1991-1993.

CAS Number	Chemical	Year	Forms Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
71-43-2	Benzene	93	469	6,712,433	4,086,692	18,793	363,660	27,515	11,209,093
		92	474	7,790,380	5,036,035	24,819	355,683	340,636	13,547,553
		91	486	9,764,018	7,996,689	26,970	824,342	111,933	18,723,952
		88	481	20,468,541	11,446,838	46,983	825,035	127,915	32,915,312
56-23-5	Carbon tetrachloride	93	74	585,481	1,643,428	1,453	34,332	79	2,264,773
		92	90	418,493	973,585	2,444	45,984	333	1,440,839
		91	102	528,622	1,019,252	2,844	42,470	2,152	1,595,340
		88	96	1,084,552	2,694,101	15,627	98,054	14,759	3,907,093
67-66-3	Chloroform	93	175	4,488,694	9,319,998	451,362	38,039	32,926	14,331,019
		92	180	6,023,765	10,998,651	654,314	50,240	28,568	17,755,538
		91	183	7,729,012	11,534,369	764,712	65,089	22,155	20,115,337
		88	170	7,618,276	18,315,290	1,131,584	36,002	68,544	27,169,696
75-09-2	Dichloro-methane	93	1,065	24,478,364	39,834,847	62,909	956,098	78,267	65,410,485
		92	1,131	27,620,595	46,671,300	233,786	1,183,867	79,308	75,788,856
		91	1,293	32,183,219	48,491,600	98,995	1,317,706	118,560	82,210,080
		88	1,668	49,531,437	79,419,932	349,960	1,478,833	157,156	130,937,318
78-93-3	Methyl ethyl ketone	93	2,418	29,044,598	55,770,325	197,216	360,927	134,162	85,507,228
		92	2,481	31,662,901	60,262,154	154,676	365,395	242,949	92,688,075
		91	2,570	35,753,846	71,050,033	143,003	355,736	166,707	107,469,325
		88	2,518	41,644,628	98,564,080	90,426	255,962	166,537	140,721,633
108-10-1	Methyl isobutyl ketone	93	1,006	7,777,025	17,317,092	90,214	131,600	76,771	25,392,702
		92	1,027	7,899,705	18,237,055	96,387	129,100	194,986	26,557,233
		91	1,041	7,285,523	19,092,111	166,952	161,600	130,415	26,836,601
		88	1,009	13,057,504	18,951,682	762,108	116,650	31,770	32,919,714
127-18-4	Tetrachloro-ethylene	93	474	4,422,676	6,519,343	10,152	15,041	618,026	11,585,238
		92	512	5,235,244	7,255,130	10,317	12,780	9,354	12,522,825
		91	573	6,619,885	10,265,361	7,448	14,000	23,309	16,930,003
		88	743	16,339,200	19,733,646	33,314	72,250	82,144	36,260,554
108-88-3	Toluene	93	3,569	60,860,617	116,441,054	133,248	967,496	234,148	178,636,563
		92	3,770	65,637,893	128,470,429	84,042	1,573,891	708,269	196,474,524
		91	3,928	76,731,982	131,544,159	105,126	1,374,207	179,951	209,935,425
		88	3,979	105,166,199	192,139,704	197,208	1,473,666	731,449	299,708,226
71-55-6	1,1,1-Trichloro-ethane	93	2,073	32,866,736	31,199,295	10,912	2,528	42,743	64,122,214
		92	3,178	57,394,283	59,679,895	13,473	561	76,381	117,164,593
		91	3,699	71,782,293	71,125,442	22,058	2,805	174,730	143,107,328
		88	3,891	92,213,890	87,022,107	95,624	1,000	204,923	179,537,544
79-01-6	Trichloro-ethylene	93	772	14,488,988	15,625,125	5,218	460	8,212	30,128,003
		92	675	15,433,613	14,744,627	8,606	466	20,726	30,208,038
		91	723	16,998,300	18,694,402	12,784	800	62,991	35,769,277
		88	946	26,077,985	29,715,662	13,801	390	21,186	55,829,024
	Xylenes	93	3,562	29,469,366	89,772,020	56,671	213,172	208,707	119,719,936
		92	3,650	30,090,855	89,471,015	46,631	219,270	1,450,908	121,278,679
		91	3,790	32,485,380	97,752,568	61,990	139,964	292,135	130,732,037
		88	3,630	39,314,201	129,388,109	213,032	144,978	647,989	169,708,309
	Cadmium and cadmium compounds	93	177	9,474	52,660	1,064	977	123,364	187,539
		92	186	13,639	55,432	1,418	1,211	77,146	148,846
		91	217	17,679	54,320	4,242	1,540	251,107	328,888
		88	206	32,399	90,293	4,397	2,409	389,729	519,227



Table 2.

CAS Number	Chemical	Year	Transfers to POTWs Pounds	Transfers Off-site for Treatment Disposal/Other ⁶ Pounds	Subtotal Pounds	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Total Transfers ⁷ Pounds
71-43-2	Benzene	93	308,621	1,855,848	2,164,469	1,101,028	1,094,354	4,359,851
		92	418,050	3,258,554	3,676,604	421,221	2,323,983	6,421,808
		91	615,849	1,796,306	2,412,155	353,207	3,675,285	6,440,647
		88	1,166,722	2,295,959	3,462,681	NA	NA	NA
56-23-5	Carbon tetrachloride	93	1,675	1,042,171	1,043,846	111,626	4,109	1,159,581
		92	1,054	851,343	852,397	345,452	24,455	1,222,304
		91	621	980,274	980,895	390,625	11,061	1,382,581
		88	5,014	1,350,011	1,355,025	NA	NA	NA
67-66-3	Chloroform	93	603,115	1,894,745	2,497,860	435,332	69,463	3,002,655
		92	553,650	960,017	1,513,667	1,417,848	765,445	3,696,960
		91	803,997	1,890,042	2,694,039	2,077,870	255,288	5,027,197
		88	1,226,573	1,369,922	2,596,495	NA	NA	NA
75-09-2	Dichloro-methane	93	843,209	9,909,042	10,752,251	20,970,440	3,241,821	34,964,512
		92	1,300,148	12,805,927	14,106,075	28,919,951	4,074,526	47,100,552
		91	1,302,744	12,889,435	14,192,179	28,472,665	3,771,339	46,436,183
		88	1,830,904	22,434,809	24,265,713	NA	NA	NA
78-93-3	Methyl ethyl ketone	93	756,561	5,944,023	6,700,584	24,231,204	45,698,371	76,630,159
		92	653,417	7,171,964	7,825,381	25,371,163	39,263,334	72,459,878
		91	777,361	10,772,234	11,549,595	27,570,244	35,471,173	74,591,012
		88	963,868	29,205,956	30,169,824	NA	NA	NA
108-10-1	Methyl isobutyl ketone	93	636,214	1,519,286	2,155,500	22,879,916	12,169,416	37,204,832
		92	776,557	1,813,291	2,589,848	20,221,693	17,380,409	40,191,950
		91	525,571	2,162,109	2,687,680	17,836,398	19,033,586	39,557,664
		88	1,509,030	10,509,249	12,018,279	NA	NA	NA
127-18-4	Tetrachloro-ethylene	93	111,007	2,412,866	2,523,873	6,033,800	823,490	9,381,163
		92	111,522	2,249,409	2,360,931	7,759,959	729,655	10,850,545
		91	234,642	3,841,153	4,075,795	10,899,318	1,263,488	16,238,601
		88	558,691	5,564,088	6,122,779	NA	NA	NA
108-88-3	Toluene	93	968,612	23,410,441	24,379,053	31,193,360	80,756,715	136,329,128
		92	1,045,966	20,909,754	21,955,720	30,096,035	79,040,678	131,092,433
		91	1,335,834	22,242,499	23,578,333	26,171,587	80,573,391	130,323,311
		88	3,591,186	61,895,064	65,486,250	NA	NA	NA
71-55-6	1,1,1-Trichloro-ethane	93	60,457	4,014,234	4,074,691	14,370,656	2,322,187	20,767,534
		92	118,518	4,983,394	5,101,912	23,284,982	3,649,347	32,036,241
		91	253,062	8,111,621	8,364,683	27,688,045	3,358,006	39,410,734
		88	304,353	19,330,828	19,635,181	NA	NA	NA
79-01-6	Trichloro-ethylene	93	45,777	2,100,087	2,145,864	6,911,325	1,196,826	10,254,015
		92	70,144	2,021,372	2,091,516	6,711,893	939,013	9,742,422
		91	73,195	2,791,045	2,864,240	6,889,209	848,596	10,602,045
		88	85,652	6,432,740	6,518,392	NA	NA	NA
	Xylenes	93	745,309	8,223,633	8,968,942	36,897,349	72,550,889	118,417,180
		92	1,142,563	8,080,631	9,223,194	39,628,825	67,092,774	115,944,793
		91	1,598,070	20,845,669	22,443,739	40,381,672	69,672,721	132,498,132
		88	4,225,457	37,917,550	42,143,007	NA	NA	NA
	Cadmium and cadmium compounds	93	4,944	3,372,687	3,377,631	2,181,549	1,142	5,560,322
		92	45,794	901,989	947,783	2,047,074	3,302	2,998,159
		91	8,559	1,319,536	1,328,095	2,263,368	7,480	3,598,943
		88	21,613	1,287,068	1,308,681	NA	NA	NA



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Table 2. TRI Releases and Transfers of 33/50 Program Chemicals, 1988, 1991-1993, Continued.

CAS Number	Chemical	Year	Forms Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
	Chromium and chromium compounds	93	3,107	406,770	423,644	250,435	42,762	23,832,948	24,956,559
		92	3,045	474,918	448,600	285,703	32,470	24,156,909	25,398,600
		91	3,054	437,245	543,947	353,123	35,134	25,960,722	27,330,171
		88	2,415	627,725	702,491	397,968	54,902	40,215,263	41,998,349
	Cyanide compounds	93	292	109,667	3,023,002	98,062	3,110,685	6,055	6,347,471
		92	293	146,738	3,249,962	87,301	3,765,225	12,953	7,262,179
		91	313	125,875	2,014,049	120,504	4,727,763	22,180	7,010,371
		88	427	657,222	1,702,448	196,962	5,445,176	108,969	8,110,777
	Lead and lead compounds	93	1,655	453,147	1,273,891	75,093	1,768	14,287,079	16,090,978
		92	1,689	644,682	1,296,114	74,265	2,888	13,987,160	16,005,109
		91	1,803	652,038	1,289,907	139,248	928	17,033,155	19,115,276
		88	1,586	839,233	1,822,159	242,159	2,760	26,684,305	29,590,616
	Mercury and mercury compounds	93	35	11,856	4,267	446	15	1,812	18,396
		92	39	11,955	5,416	575	9	3,139	21,094
		91	56	12,958	8,330	676	9	5,294	27,267
		88	53	16,797	8,484	1,656	27	13,529	40,493
	Nickel and nickel compounds	93	2,459	225,313	275,493	94,194	133,238	3,292,612	4,020,850
		92	2,380	579,020	290,386	111,124	297,762	3,732,437	5,010,729
		91	2,369	400,136	328,073	131,679	370,948	1,701,734	2,932,570
		88	1,716	423,719	293,576	224,427	239,263	3,637,777	4,818,762
Total for 33/50 Chemicals		93	23,382	216,411,205	392,582,176	1,557,442	6,372,798	43,005,426	659,929,047
		92	24,800	257,078,679	447,145,786	1,889,881	8,036,802	45,122,162	759,273,310
		91	26,200	299,508,011	492,804,612	2,162,354	9,435,041	46,259,230	850,169,248
		88	25,534	415,113,508	692,010,602	4,017,236	10,247,357	73,303,944	1,194,692,647
Total for All Other TRI Chemicals		93	55,690	263,834,737	782,530,630	269,534,823	569,621,351	245,968,138	2,131,489,679
		92	56,428	284,061,160	860,016,711	274,221,490	717,784,301	295,057,336	2,431,140,998
		91	57,425	319,122,730	910,892,761	243,139,154	699,750,068	370,454,785	2,543,359,498
		88	52,674	424,929,092	1,174,944,163	307,570,566	1,332,110,315	439,992,727	3,679,546,863
Total for All TRI Chemicals		93	79,072	480,245,942	1,175,112,806	271,092,265	575,994,149	288,973,564	2,791,418,726
		92	81,228	541,139,839	1,307,162,497	276,111,371	725,821,103	340,179,498	3,190,414,308
		91	83,625	618,630,741	1,403,697,373	245,301,508	709,185,109	416,714,015	3,393,528,746
		88	78,208	840,042,600	1,866,954,765	311,587,802	1,342,357,672	513,296,671	4,874,239,510



Table 2, Cont.

CAS Number	Chemical	Year	Transfers to POTWs Pounds	Transfers Off-site for Treatment Disposal/Other ⁶ Pounds	Subtotal Pounds	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Total Transfers ⁷ Pounds
	Chromium and chromium compounds	93	443,461	34,946,871	35,390,332	124,075,218	31,061	159,496,611
		92	947,121	19,018,511	19,965,632	99,174,280	89,965	119,229,877
		91	940,780	20,378,515	21,319,295	68,792,255	123,934	90,235,484
		88	2,080,868	26,800,100	28,880,968	NA	NA	NA
	Cyanide compounds	93	100,184	477,812	577,996	24,600	2,261	604,857
		92	88,027	635,105	723,132	94,518	500	818,150
		91	121,476	714,580	836,056	82,410	500	918,966
		88	1,152,828	2,719,248	3,872,076	NA	NA	NA
	Lead and lead compounds	93	139,125	26,323,018	26,462,143	291,053,994	83,202	317,599,339
		92	358,126	37,611,890	37,970,016	403,989,489	59,068	442,018,573
		91	335,652	20,926,102	21,261,754	223,965,984	69,482	245,297,220
		88	213,423	31,195,505	31,408,928	NA	NA	NA
	Mercury and mercury compounds	93	21	74,706	74,727	23,639	0	98,366
		92	22	239,781	239,803	51,455	1	291,259
		91	314	153,816	154,130	465,489	5	619,624
		88	1,892	275,017	276,909	NA	NA	NA
	Nickel and nickel compounds	93	219,692	9,870,359	10,090,051	90,127,604	13,405	100,231,060
		92	252,193	11,976,032	12,228,225	80,374,621	34,628	92,637,474
		91	388,355	9,232,462	9,620,817	66,310,972	19,983	75,951,772
		88	902,763	13,646,458	14,549,221	NA	NA	NA
	Total for 33/50 Chemicals	93	5,987,984	137,391,829	143,379,813	672,622,640	220,058,712	1,036,061,165
		92	7,882,872	135,488,964	143,371,836	769,910,459	215,471,083	1,128,753,378
		91	9,316,082	141,047,398	150,363,480	550,611,318	218,155,318	919,130,116
		88	19,840,837	274,229,572	294,070,409	NA	NA	NA
	Total for All Other TRI Chemicals	93	308,179,985	511,643,134	819,823,119	2,576,347,350	266,245,023	3,662,415,492
		92	428,516,829	536,944,769	965,461,598	2,163,775,010	256,781,485	3,386,018,093
		91	384,562,040	483,024,578	867,586,618	1,737,931,181	225,157,474	2,830,675,273
		88	562,139,116	758,513,529	1,320,652,645	NA	NA	NA
	Total for All TRI Chemicals	93	314,167,969	649,034,963	963,202,932	3,248,969,990	486,303,735	4,698,476,657
		92	436,399,701	672,433,733	1,108,833,434	2,933,685,469	472,252,568	4,514,771,471
		91	393,878,122	624,071,976	1,017,950,098	2,288,542,499	443,312,792	3,749,805,389
		88	581,979,953	1,032,743,101	1,614,723,054	NA	NA	NA

⁶ "Other" indicates: For 1991, 1992, and 1993, transfers reported with no waste management codes or invalid codes. For 1988, transfers reported with no waste management codes, invalid codes, or codes not required to be reported in 1988.

⁷ Because transfers for recycling and energy recovery were not required to be reported in 1988, total transfers in 1988 are not comparable to total transfers reported for 1991, 1992, or 1993.



33/50 Program Chemical Identities

In the tables in this chapter, the 33/50 Program chemicals appear in alphabetical order by organic chemicals followed by inorganic chemicals. Xylenes and the inorganic chemicals have been grouped into categories, as shown below. The 10 individual organic chemicals and the seven groups constitute the 17 high-priority chemicals targeted by the 33/50 Program.

Organic chemicals

71-43-2	Benzene
56-23-5	Carbon tetrachloride
67-66-3	Chloroform
75-09-2	Dichloromethane
78-93-3	Methyl ethyl ketone
108-10-1	Methyl isobutyl ketone
127-18-4	Tetrachloroethylene
108-88-3	Toluene
71-55-6	1,1,1-Trichloroethane
79-01-6	Trichloroethylene

Xylenes

108-38-3	m-Xylene
95-47-6	o-Xylene
106-42-3	p-Xylene
1330-20-7	Xylene (mixed isomers)

Inorganic chemicals^③

Cadmium and cadmium compounds

7440-43-9	Cadmium
—	Cadmium compounds

Chromium and chromium compounds

7440-47-3	Chromium
—	Chromium compounds

Cyanide compounds

74-90-8	Hydrogen cyanide
—	Cyanide compounds

Lead and lead compounds

7439-92-1	Lead
—	Lead compounds

Mercury and mercury compounds

7439-97-6	Mercury
—	Mercury compounds

Nickel and nickel compounds

7440-02-0	Nickel
—	Nickel compounds

Figure 7 shows the percentage reduction for the 11 organic chemicals and their compounds and the six inorganic chemical compounds, as well as for the total 33/50 chemicals. All percentages are calculated from a 1988 baseline. As the figure shows, releases and transfers of organic chemicals have steadily declined from 1988 to 1993 for a total reduction of nearly 46% over the time period. Releases and transfers of inorganic compounds, on the other hand, decreased from 1988 to 1991, then began increasing, with a result that, in total, releases and transfers of inorganics have decreased less than 23% from 1988 to 1993. Because the inorganics account for a much smaller percentage of the total releases and transfers of 33/50 Program chemicals, however, their relatively small percentage decrease has had little impact on the total percentage reduction of 33/50 chemicals.

The 11 organic chemicals accounted for 94% of all reductions in 33/50 chemicals between 1988 and 1993, while inorganics accounted for 6% of total reductions. There are two reasons for this result. First, organics accounted for a much larger percent of total releases and transfers in 1988 than inorganics (89% vs 11%). Second, the percentage reduction in releases and transfers of organics was much larger from 1988-1993 than for inorganics (49% vs 23%).

Five chemicals accounted for 78% of total reductions in 33/50 Program releases and transfers between 1988 and 1993: dichloromethane (12%), methyl ethyl ketone (11%), toluene (24%) 1,1,1-trichloroethane (19%), and xylenes (12%).

These results are not surprising given that these five organic chemicals were the largest source of releases and transfers of 33/50 chemicals in 1988 (74%). These chemicals still comprise

Box 2. 33/50 Program Chemical Identities.

③ Compound categories do not have CAS numbers (—).

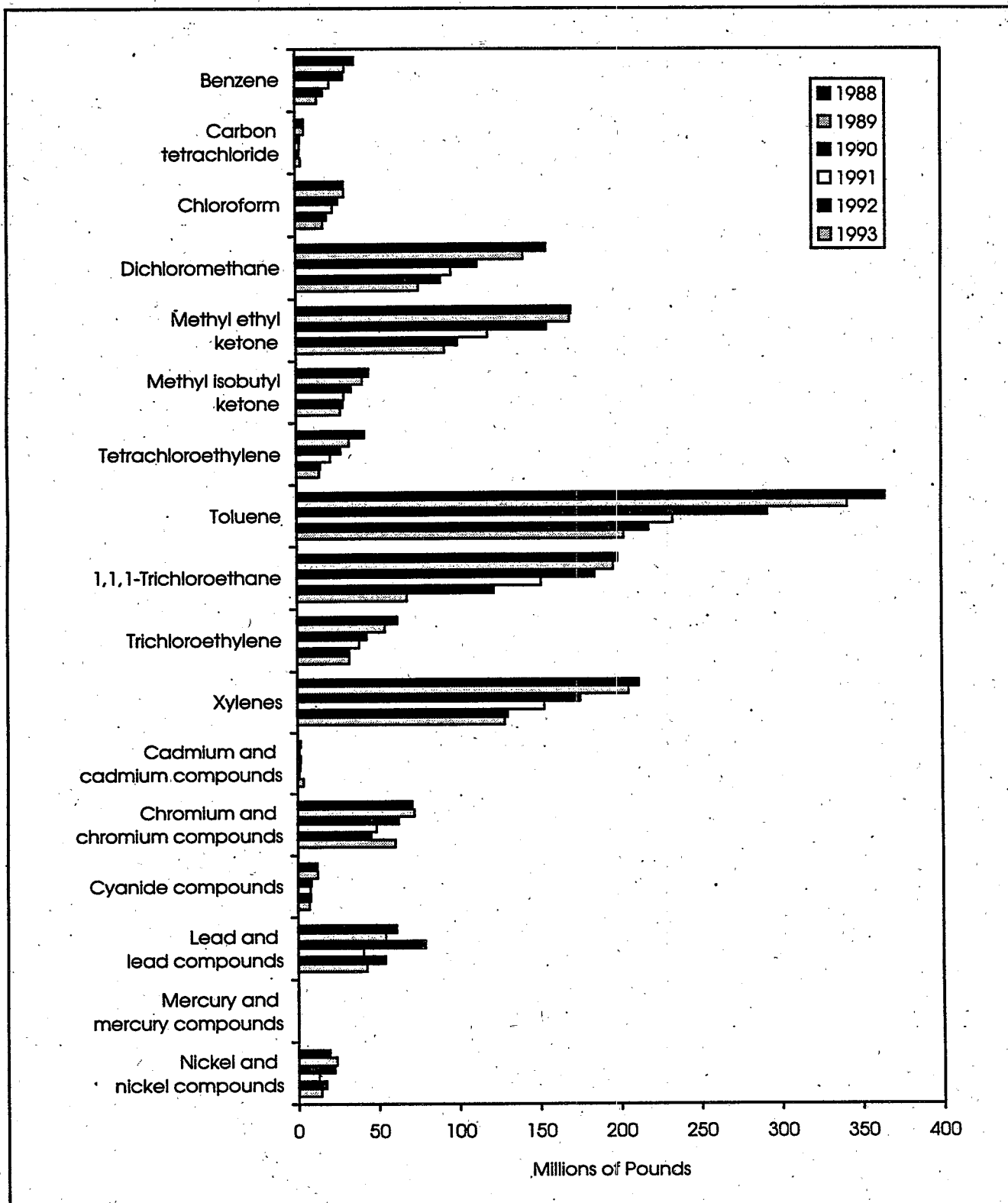


Figure 6. TRI Releases and Transfers of 33/50 Program Chemicals, by Chemical, 1988-1993.⑨

⑨ The amounts for recycling and energy recovery reported for 1991-1993 have not been included in these totals.



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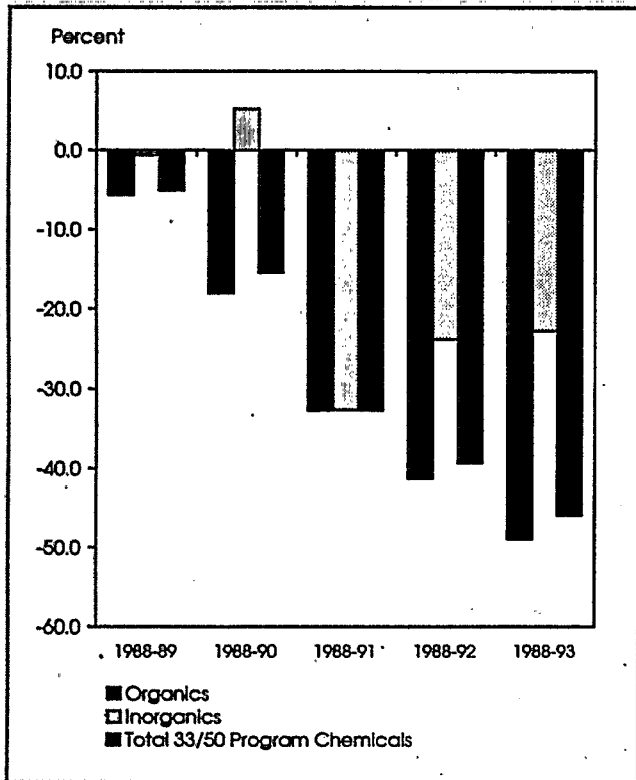


Figure 7. Percentage Change in Releases and Transfers of 33/50 Program Chemicals (Organics vs. Inorganics), 1988-1993.¹⁰

nearly 71% of all releases and transfers of 33/50 chemicals. All organics represent 84% of total releases and transfers of 33/50 chemicals. Inorganics, however, are increasing in prominence, representing 16% of total releases and transfers of 33/50 Program chemicals in 1993, up from 11% in 1988. Lead and compounds and chromium and compounds are the most important inorganics, accounting for 5% and 8% respectively of total releases and transfers of 33/50 chemicals in 1993. Cadmium and compounds had a large percentage increase during the time period, but because total quantities of these compounds are small, the impact on total releases and transfers was negligible.

Figure 8 shows the percent change in releases and transfers of 33/50 Program chemicals from 1988 to 1993 for each chemical. With the exception of mercury and compounds, the inorganic chemicals (presented at the bottom of the figure) show smaller percentage decreases than observed for the 11 organic chemicals between 1988 and 1993, and releases and transfers of one of the inorganics (cadmium and compounds) actually increased, nearly doubling.

Figure 9 presents a graphical representation of the data in Table 2 by release medium and transfer type for the years 1988 to 1993. Figure 10 shows the percent change in releases and transfers from 1988 to 1993 by release medium and transfer type. Figure 11 shows the contribution of each release medium and transfer type to total reductions in releases and transfers of 33/50 chemicals from 1988 to 1993. As these diagrams show, the largest quantity reductions in releases and transfers have occurred in air emissions. Reductions in these sources account for 73% of total reductions in releases and transfers of 33/50 chemicals. All sources, however, have experienced significant percentage reductions.

Transfers to Energy Recovery and Recycling

The Pollution Prevention Act of 1990 (PPA) substantially expanded the scope of TRI to include reporting on additional toxic chemical management activities. Off-site transfers to energy recovery and recycling processes are now reported in Section 6 of Form R in addition to the previously reported transfers to POTWs and other treatment and disposal facilities.

¹⁰ The amounts for recycling and energy recovery reported for 1991-1993 have not been included in these totals.

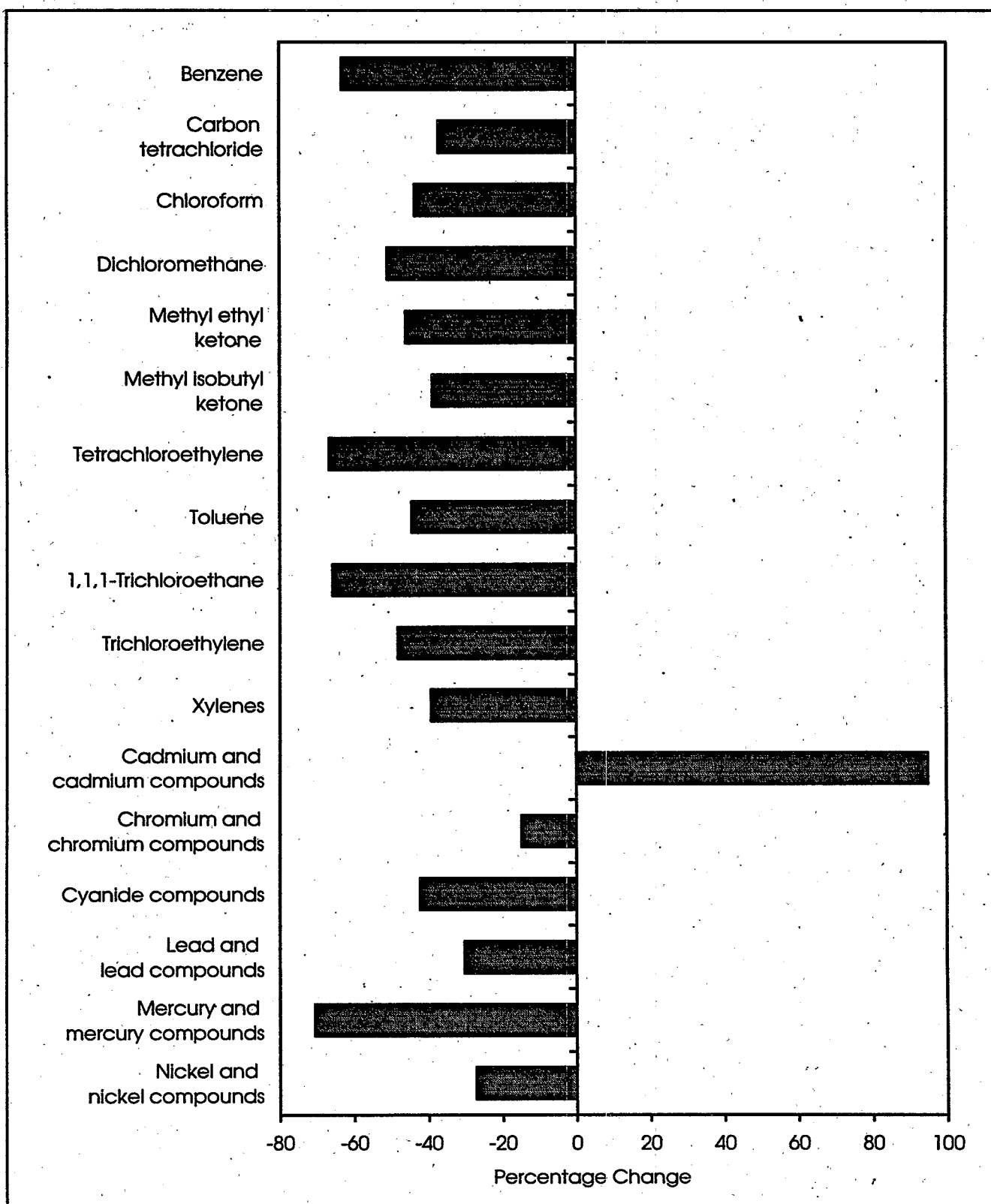


Figure 8. Percentage Change in Total Releases and Transfers of 33/50 Program Chemicals, 1988-1993. ①

① The amounts for recycling and energy recovery reported for 1991-1993 have not been included in these totals.



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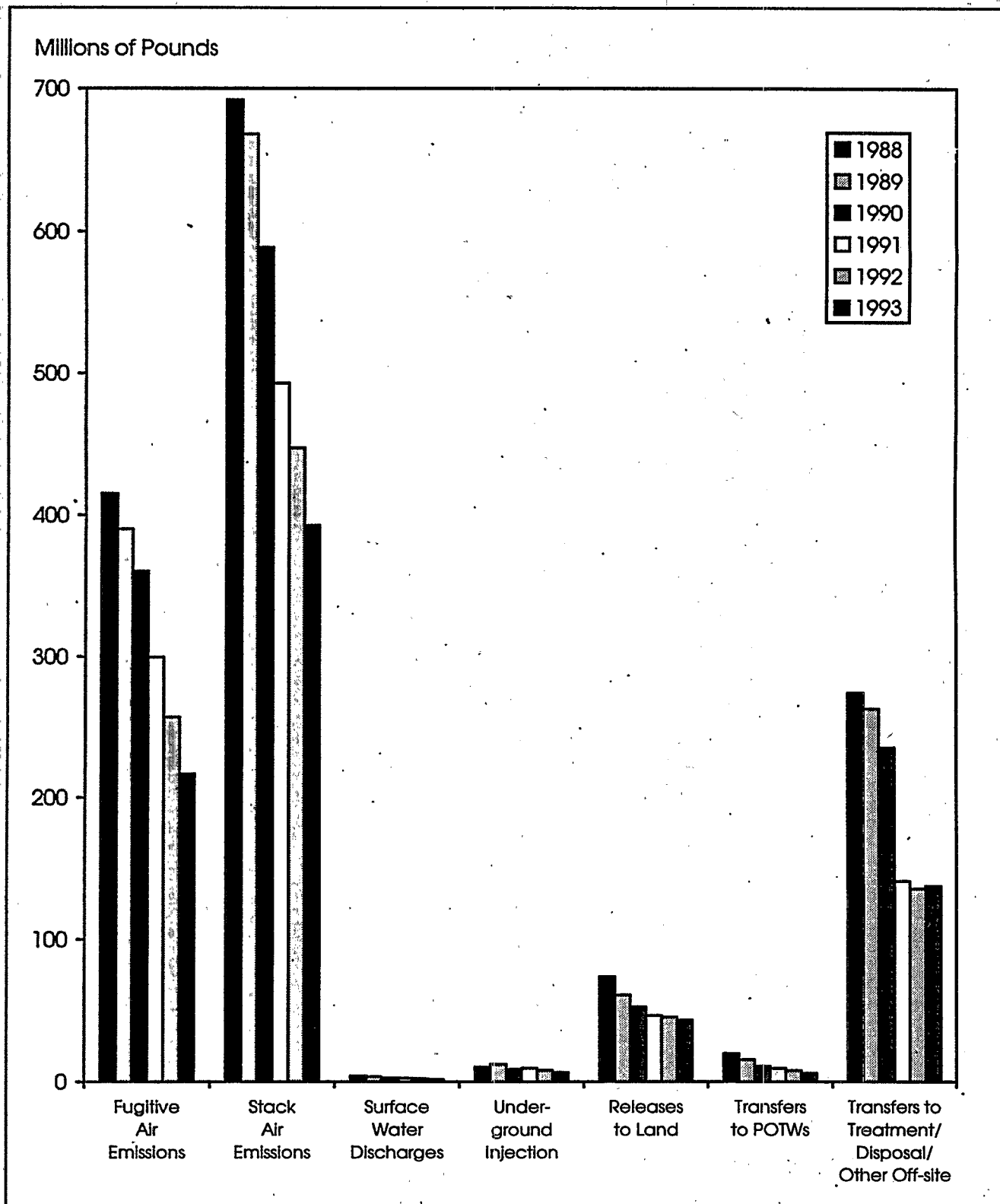


Figure 9. TRI Releases and Transfers of 33/50 Program Chemicals, by Release Medium and Transfer Type, 1988-1993. (2)

(2) The amounts for recycling and energy recovery reported for 1991-1993 have not been included in these totals.

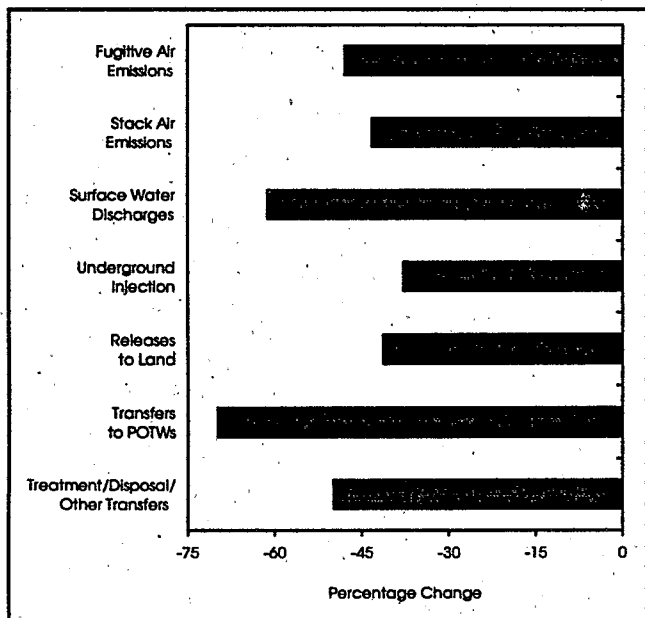


Figure 10. Percentage Change in Releases and Transfers by Release Medium or Transfer Type, 1988-1993.¹³

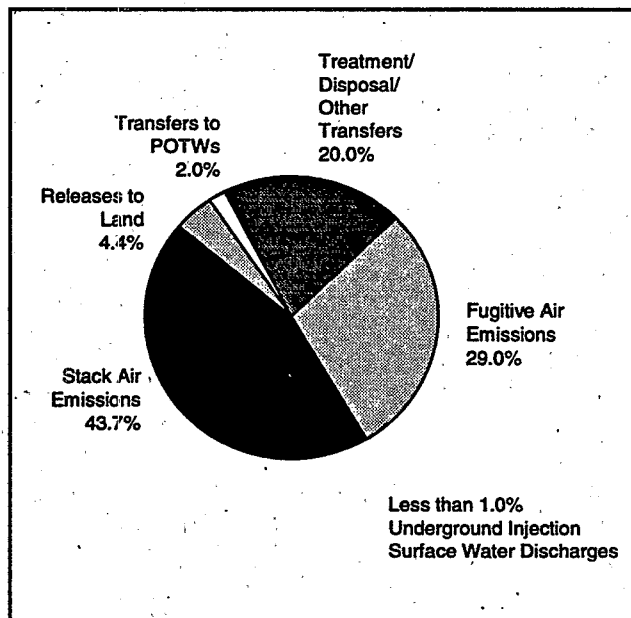


Figure 11. Contribution to Reductions in Releases and Transfers of 33/50 Program Chemicals by Release Medium or Transfer Type, 1988-1993.¹³

Facilities' reports of transfers to energy recovery and recycling for 1991-1993 are presented after the "Subtotal" column in Table 2. The absence of reporting requirements for these activities in 1988 is reflected by "NA." Transfers to energy recovery (220.1 million pounds) and transfers to recycling (672.6 million pounds) in 1993 again substantially exceeded the total for all previously reported types of off-site transfers of 33/50 Program chemicals (143.4 million pounds). Transfers to energy recovery increased slightly in 1993 (2.1%), while transfers to recycling decreased significantly (12.6%) after increasing by 40% in 1992.

33/50 PROGRAM CHEMICALS IN WASTE

In Section 8 of Form R, which was made mandatory under the PPA starting with the 1991 reporting year, facilities report the amounts of toxic chemicals:

- recycled or reused in on-site processes and/or sent off-site for recycling;
- combusted in on-site and/or sent to off-site energy recovery systems;
- destroyed in on-site treatment systems and/or sent to off-site treatment facilities;
- released to the environment as a result of on-site operations plus the amounts shipped off-site for disposal.

¹³ The amounts for recycling and energy recovery reported for 1991-1993 have not been included in these totals.



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Table 3. Total Production-Related Waste for 33/50 Chemicals Compared to Other TRI Chemicals, 1991-1995.

	All TRI Chemicals	TRI Chemicals Less 33/50 Chemicals	33/50 Chemicals Only
	Pounds	Pounds	Pounds
1991 ¹⁴	32,755,040,741	27,239,462,028	5,515,578,713
1992	32,884,508,120	27,062,076,135	5,822,431,985
1993	33,498,461,670	27,508,791,099	5,989,670,571
1994 ¹⁵	33,447,534,630	27,806,339,673	5,641,194,957
1995 ¹⁵	33,986,505,265	28,321,019,790	5,665,485,475
	Percent Change	Percent Change	Percent Change
1991-1993	2.3%	1.0%	8.6%
1993-1995 ¹⁵	1.5%	3.0%	-5.4%
1991-1995 ¹⁵	3.8%	4.0%	2.7%

Section 8 reporting items described above pertain only to chemical quantities contained in waste that are the result of regular production-related activities. Toxic chemical quantities contained in waste that are generated at the facility through non-routine activities, such as spill clean-ups and catastrophic events, are reported in a separate Section 8 reporting item. Each of the items reported for production-related waste in Section 8 is reported in aggregate, by chemical, for the reporting year (1993), the prior year (1992), and forecast by facilities for the two successive years (1994 and 1995).

Analysts will note significant discrepancies between reported off-site transfers to recycling in Sections 6 and 8 of Form R. Less significant discrepancies can also be observed in the reporting of off-site shipments to energy recovery and treatment. The causes and meaning of these discrepancies, which are related to TRI reporting guidance, are discussed in Chapter 2

of 1993 Toxics Release Inventory: Public Data Release (EPA 745-R-95-010, March 1995).

Throughout this report, 1991 data are drawn from prior year reports by facilities in their 1992 Form R submissions. 1992 and 1993 data are actual quantities reported in 1993 Form Rs, and 1994 and 1995 data represent facility future year projections reported on 1993 Form R's.

Table 3 presents facility reports of total production-related waste for 33/50 Program chemicals versus reports for all other TRI chemicals for 1991-1995. All forms submitted for TRI chemicals for the two years 1992 and 1993 are included. The trends in reductions for each grouping of chemicals are depicted in Figure 2 presented at the beginning of this report.

Total production-related waste associated with 33/50 Program chemicals increased slightly (2.9%) in 1993, a much reduced rate from that

¹⁴ As reported for the previous year on 1992 Form Rs.

¹⁵ Projected amounts.



experienced in 1992 (5.6%). Production waste for non-Program chemicals also increased in 1993, but by a somewhat smaller proportion (1.7%).

Facilities are projecting a significant reduction in production waste of 33/50 Program chemicals in 1994, a 5.8% decline. At the same time, production-related waste for other TRI chemicals is expected to again increase slightly (1.1%). Projections for 1995 suggest no change in 33/50 Program chemical waste, while non-Program chemical waste is forecast to continue its slow but steady rise by an additional 2%.

Analyses of facility projections, particularly as national aggregates, should be viewed with caution. Forecasting waste generation is an imprecise art, and facilities are not bound by their estimates for future years. A review of our analysis of facilities' 1992 TRI reports reinforces this point. On page 284 of the 1992 Public Data Release report, we observed that facilities were projecting a decline of nearly 4% in their production waste for 33/50 Program chemicals in 1993. Actual data subsequently reported for 1993 showed an increase of nearly 3%.

Facilities owned by 33/50 Program participating companies reported reductions in production-related waste for 33/50 Program chemicals, while facilities of non-participants reported increases. Those belonging to participating companies reported a 0.5% decrease from 1992 to 1993 and projected an additional 15% decrease from 1993 to 1995. Those facilities belonging to non-participating companies reported an 8% increase from 1993 to 1995 and projected a similar 7% increase from 1993 to 1995.

33/50 Program Chemicals in Waste, by Medium/ Management Method and by Chemical

Production-related waste for 33/50 Program chemicals is summarized by chemical and waste management method for the period 1991 to 1995 in Tables 4 through 8. Figure 12 presents a graphical representation of the total production-related waste for each chemical for these years.

Figure 13 shows these data in terms of the percent change in total production-related waste for the periods 1991-1993 (actual change) and 1993-1995 (projected change).

From 1991 to 1993, total production-related waste decreased significantly (over 50 million pounds for each of four chemicals) in terms of quantity for 1,1,1-trichloroethane (156 million pounds), benzene (120 million pounds), lead and compounds (94 million pounds), and methyl isobutyl ketone (54 million pounds). Total production-related waste of three other chemicals, carbon tetrachloride, tetrachloroethylene, and chloroform, decreased significantly on a percentage basis (over 10%). Production/import of 1,1,1-trichloroethane and carbon tetrachloride is banned in the United States after January 1, 1996.

From 1991 to 1993, total production-related waste increased over 50 million pounds each for four chemicals: toluene (613 million pounds), chromium and compounds (119 million pounds), trichloroethylene (72 million pounds), and xylene (65 million pounds). On a percentage basis, total production-related waste increased by over 10% for an additional three chemicals: mercury and compounds, cadmium and compounds, and nickel and compounds. The increase in total production-related waste for these chemicals suggests that the decrease in



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Table 4. Quantity of 33/50 Chemicals Recycled On-site and Off-site, by Chemical, 1991-1995.⁽⁶⁾

CAS Number		Projected Data				
Chemical		1991 Recycled Pounds	1992 Recycled Pounds	1993 Recycled Pounds	1994 Recycled Pounds	1995 Recycled Pounds
Recycled On-site						
71-43-2	Benzene	170,751,241	58,140,117	64,592,187	57,933,552	57,948,453
56-23-5	Carbon tetrachloride	10,540,016	9,236,700	2,550,095	2,967,261	2,287,051
67-66-3	Chloroform	5,924,899	6,502,899	4,968,367	4,788,270	4,299,120
75-09-2	Dichloromethane	72,046,695	74,553,992	86,323,177	70,650,427	74,756,704
78-93-3	Methyl ethyl ketone	152,220,826	167,239,880	170,138,600	172,326,231	256,172,729
108-10-1	Methyl isobutyl ketone	110,036,801	57,776,059	50,396,415	46,634,071	43,383,419
127-18-4	Tetrachloroethylene	95,135,088	73,767,202	75,066,459	66,125,470	60,848,582
108-88-3	Toluene	595,782,778	1,038,335,627	1,159,918,428	1,077,941,693	1,075,531,359
71-55-6	1,1,1-Trichloroethane	190,012,133	160,864,056	111,402,660	94,457,572	81,103,230
79-01-6	Trichloroethylene	221,288,591	293,278,354	293,306,078	270,421,086	180,004,285
	Xylenes	118,379,096	112,874,807	124,956,236	120,414,398	122,050,873
	Cadmium and cadmium compounds	3,610,253	11,749,796	4,085,968	4,254,187	4,250,378
	Chromium and chromium compounds	65,509,364	63,740,754	72,122,696	66,602,127	62,037,898
	Cyanide compounds	3,523,828	632,924	575,782	560,672	562,271
	Lead and lead compounds	774,811,943	701,521,076	682,260,064	587,405,788	516,429,330
	Mercury and mercury compounds ⁽⁷⁾	1,118,830	1,597,398	13,969,063	14,009,246	14,046,905
	Nickel and nickel compounds	47,342,031	45,123,020	48,652,367	66,699,132	78,241,543
Subtotal for 33/50 Chemicals		2,638,034,413	2,876,934,661	2,965,284,642	2,724,191,183	2,633,954,130
Subtotal for All Other TRI Chemicals		9,560,402,737	9,288,899,428	10,226,021,866	10,954,691,259	11,076,020,920
Subtotal for All TRI Chemicals		12,198,437,150	12,165,834,089	13,191,306,508	13,678,882,442	13,709,975,050
Recycled Off-site						
71-43-2	Benzene	1,420,007	565,557	1,079,229	587,808	538,656
56-23-5	Carbon tetrachloride	390,924	290,483	111,606	107,764	107,714
67-66-3	Chloroform	2,094,019	1,417,917	435,102	452,586	452,036
75-09-2	Dichloromethane	26,563,629	24,946,875	21,079,024	17,210,281	14,007,676
78-93-3	Methyl ethyl ketone	24,414,975	25,226,050	21,612,758	18,867,392	18,967,066
108-10-1	Methyl isobutyl ketone	16,670,629	19,388,510	23,026,951	22,606,704	21,910,014
127-18-4	Tetrachloroethylene	12,004,595	9,388,106	7,712,315	7,249,241	7,027,729
108-88-3	Toluene	25,372,734	29,683,884	31,868,427	21,941,647	21,217,897
71-55-6	1,1,1-Trichloroethane	26,605,801	19,297,809	14,606,493	6,658,052	3,218,518
79-01-6	Trichloroethylene	7,275,576	6,395,902	7,091,492	6,773,498	5,767,852
	Xylenes	33,647,064	36,070,567	36,142,814	35,024,904	34,785,644
	Cadmium and cadmium compounds	1,860,251	1,632,131	2,086,210	1,969,814	1,990,990
	Chromium and chromium compounds	100,263,398	112,502,108	127,799,872	129,133,371	150,125,384
	Cyanide compounds	46,631	15,226	15,533	12,837	13,291
	Lead and lead compounds	295,857,177	266,314,184	291,107,147	287,000,510	289,885,188
	Mercury and mercury compounds	60,547	51,388	24,288	329,650	26,950
	Nickel and nickel compounds	81,086,951	85,609,029	93,936,825	97,214,709	98,108,484
Subtotal for 33/50 Chemicals		655,634,908	638,795,726	679,736,086	653,140,768	668,151,089
Subtotal for All Other TRI Chemicals		2,336,056,325	2,551,973,435	2,644,877,989	2,674,911,986	2,881,684,184
Subtotal for All TRI Chemicals		2,991,691,233	3,190,769,161	3,324,614,075	3,328,052,754	3,549,835,273
Total for 33/50 Chemicals		3,293,669,321	3,515,730,387	3,645,020,728	3,377,331,951	3,302,105,219
Total for All Other TRI Chemicals		11,896,459,062	11,840,872,863	12,870,899,855	13,629,603,245	13,957,705,104
Total for All TRI Chemicals		15,190,128,383	15,356,603,250	16,515,920,583	17,006,935,196	17,259,810,323

⁽⁶⁾ Data from 1991 as reported on 1992 forms; all other years from 1993 forms.

⁽⁷⁾ A reporting error by one facility resulted in on-site recycling of mercury being overstated by nearly 13 million pounds for 1993, 1994, and 1995. At the time this error was detected, it was too late to correct the tables and figures presented in this report.

Table 5. Quantity of 33/50 Chemicals Used for Energy Recovery On-site and Off-site, by Chemical, 1991-1995.¹⁸

CAS Number	Chemical	1991 Energy Recovery Pounds	1992 Energy Recovery Pounds	1993 Energy Recovery Pounds	Projected Data	
					1994 Energy Recovery Pounds	1995 Energy Recovery Pounds
Energy Recovery On-site						
71-43-2	Benzene	33,591,155	37,366,545	26,250,860	27,638,258	28,141,591
56-23-5	Carbon tetrachloride	4,421,868	4,803,854	5,139,747	5,070,222	5,073,782
67-66-3	Chloroform	5,495,474	13,818,864	16,980,876	17,215,650	17,310,574
75-09-2	Dichloromethane	10,662,551	10,706,117	10,502,937	11,553,556	12,153,787
78-93-3	Methyl ethyl ketone	88,017,835	88,676,279	99,289,155	107,767,007	171,316,793
108-10-1	Methyl isobutyl ketone	39,271,740	43,905,284	39,090,875	40,757,131	44,458,876
127-18-4	Tetrachloroethylene	5,507,721	7,507,732	11,124,256	11,358,592	11,476,521
108-88-3	Toluene	254,268,130	289,201,036	254,771,684	282,553,285	309,458,527
71-55-6	1,1,1-Trichloroethane	5,422,186	8,010,000	4,534,328	4,502,533	4,511,100
79-01-6	Trichloroethylene	2,248,000	1,083,000	1,216,631	1,118,700	1,149,366
	Xylenes	218,652,341	243,832,323	245,700,894	267,101,655	294,200,290
	Cadmium and cadmium compounds	0	0	0	0	0
	Chromium and chromium compounds	8,331	0	69,034	29,518	35,422
	Cyanide compounds	21,987,509	22,807,069	12,229,599	14,527,863	16,530,983
	Lead and lead compounds	3,500	4,000	39,325	39,125	46,110
	Mercury and mercury compounds	0	0	0	0	0
	Nickel and nickel compounds	0	0	0	0	0
Subtotal for 33/50 Chemicals		689,558,341	771,722,103	726,940,201	791,233,095	915,863,722
Subtotal for All Other TRI Chemicals		2,370,806,616	2,365,066,193	2,111,404,739	2,231,557,742	2,286,670,841
Subtotal for All TRI Chemicals		3,060,364,957	3,136,788,296	2,838,344,940	3,022,790,837	3,202,534,563
Energy Recovery Off-site						
71-43-2	Benzene	4,621,375	3,331,203	1,996,334	1,912,548	1,563,917
56-23-5	Carbon tetrachloride	9,955	2,351	4,116	3,513	2,213
67-66-3	Chloroform	713,071	175,369	60,631	44,229	46,159
75-09-2	Dichloromethane	3,619,976	2,435,825	3,252,921	2,647,429	2,497,953
78-93-3	Methyl ethyl ketone	32,535,051	39,889,681	46,796,184	43,443,289	42,033,167
108-10-1	Methyl isobutyl ketone	13,506,753	9,998,054	12,145,798	12,738,010	12,746,683
127-18-4	Tetrachloroethylene	597,416	510,982	887,593	659,843	615,361
108-88-3	Toluene	75,210,184	77,975,615	86,966,647	78,939,246	74,372,577
71-55-6	1,1,1-Trichloroethane	2,967,446	2,066,496	2,408,852	1,221,420	705,608
79-01-6	Trichloroethylene	894,895	780,913	1,485,511	1,206,577	901,321
	Xylenes	61,909,144	64,293,309	72,416,669	66,660,656	63,897,743
	Cadmium and cadmium compounds	6,525	3,052	1,142	1,009	1,006
	Chromium and chromium compounds	171,399	19,817	93,386	83,083	84,061
	Cyanide compounds	24	285	1,812	1,768	1,818
	Lead and lead compounds	2,535,207	52,221	80,422	81,206	80,779
	Mercury and mercury compounds	0	0	0	0	0
	Nickel and nickel compounds	20,884	8,086	8,031	9,382	9,848
Subtotal for 33/50 Chemicals		199,319,305	201,543,259	228,606,049	209,653,208	199,560,214
Subtotal for All Other TRI Chemicals		250,816,216	252,466,616	283,168,892	258,281,300	242,492,651
Subtotal for All TRI Chemicals		450,135,521	454,009,875	511,774,941	467,934,508	442,052,865
Total for 33/50 Chemicals		888,877,646	973,265,362	955,546,250	1,000,886,303	1,115,423,936
Total for All Other TRI Chemicals		2,621,622,832	2,617,532,809	2,394,573,631	2,489,839,042	2,529,163,492
Total for All TRI Chemicals		3,510,500,478	3,590,798,171	3,350,119,881	3,490,725,345	3,644,587,428

¹⁸ Data from 1991 as reported on 1992 forms; all other years from 1993 forms.



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Table 6. Quantity of 33/50 Chemicals Treated On-site and Off-site, by Chemical, 1991-1995.

		Projected Data				
CAS Number	Chemical	1991 Treated Pounds	1992 Treated Pounds	1993 Treated Pounds	1994 Treated Pounds	1995 Treated Pounds
Treated On-site						
71-43-2	Benzene	30,119,976	27,829,162	33,534,801	31,809,928	35,781,910
56-23-5	Carbon tetrachloride	15,315,779	14,767,625	14,828,380	15,102,091	14,688,253
67-66-3	Chloroform	23,235,891	13,999,132	14,082,436	13,766,146	13,718,792
75-09-2	Dichloromethane	32,784,823	35,268,167	27,362,316	20,515,418	24,371,737
78-93-3	Methyl ethyl ketone	46,612,283	51,383,051	54,609,698	55,367,005	56,199,052
108-10-1	Methyl isobutyl ketone	10,488,809	10,091,327	12,760,735	12,709,751	12,541,566
127-18-4	Tetrachloroethylene	14,129,320	15,141,102	16,700,355	16,718,061	16,704,623
108-88-3	Toluene	114,635,977	129,175,878	155,856,226	157,391,031	174,646,088
71-55-6	1,1,1-Trichloroethane	1,527,388	1,512,933	1,914,565	1,936,117	1,784,442
79-01-6	Trichloroethylene	3,733,915	4,987,486	6,515,991	6,662,985	7,195,208
	Xylenes	40,924,880	44,416,177	64,246,861	61,791,374	66,876,892
	Cadmium and cadmium compounds	523,743	605,392	163,206	156,907	511,331
	Chromium and chromium compounds	35,008,451	86,124,374	91,481,853	100,376,036	100,503,098
	Cyanide compounds	18,951,283	24,475,591	33,658,137	32,582,601	32,837,005
	Lead and lead compounds	36,789,290	35,958,348	41,310,490	43,155,159	44,436,811
	Mercury and mercury compounds	35,303	31,042	44,176	23,173	23,173
	Nickel and nickel compounds	1,898,249	2,321,002	2,615,003	2,581,963	2,423,804
Subtotal for 33/50 Chemicals		426,715,360	498,087,789	571,685,229	572,645,746	605,243,785
Subtotal for All Other TRI Chemicals		9,415,437,028	9,385,490,508	9,196,588,064	9,025,178,244	9,249,460,926
Subtotal for All TRI Chemicals		9,842,152,388	9,883,578,297	9,768,273,293	9,597,823,990	9,854,704,711
Treated Off-site						
71-43-2	Benzene	2,190,932	1,390,189	2,085,219	2,020,307	1,299,192
56-23-5	Carbon tetrachloride	820,033	778,012	906,664	610,525	562,094
67-66-3	Chloroform	2,082,474	1,930,016	2,405,711	2,675,485	2,246,126
75-09-2	Dichloromethane	9,573,955	13,965,999	10,509,299	9,356,395	9,569,689
78-93-3	Methyl ethyl ketone	7,777,191	6,353,837	6,533,657	5,268,961	6,031,620
108-10-1	Methyl isobutyl ketone	2,186,478	1,913,351	1,919,172	1,802,453	1,533,699
127-18-4	Tetrachloroethylene	3,098,538	1,981,397	2,488,782	2,117,815	1,938,357
108-88-3	Toluene	14,108,349	18,716,023	16,997,430	17,390,007	18,000,579
71-55-6	1,1,1-Trichloroethane	4,888,401	3,687,100	3,423,144	2,115,715	1,447,987
79-01-6	Trichloroethylene	1,584,257	2,250,300	1,818,275	1,497,837	1,212,789
	Xylenes	10,889,446	8,971,445	8,083,355	7,989,388	7,937,851
	Cadmium and cadmium compounds	310,881	542,137	232,879	227,344	220,010
	Chromium and chromium compounds	4,176,295	4,333,947	19,993,798	3,848,693	3,652,251
	Cyanide compounds	463,621	435,005	455,380	359,080	342,477
	Lead and lead compounds	4,860,034	4,772,651	6,405,526	5,692,218	6,584,469
	Mercury and mercury compounds	56,340	9,276	1,329	1,211	1,207
	Nickel and nickel compounds	1,969,278	2,674,637	2,436,417	2,292,532	2,143,908
Subtotal for 33/50 Chemicals		71,036,503	74,705,322	86,696,037	65,265,966	64,724,305
Subtotal for All Other TRI Chemicals		611,460,693	625,644,432	571,089,060	535,941,684	503,872,097
Subtotal for All TRI Chemicals		682,497,196	700,349,754	657,785,097	601,207,650	568,596,402
Total for 33/50 Chemicals		497,751,863	572,793,111	658,381,266	637,911,712	669,968,090
Total for All Other TRI Chemicals		10,026,897,721	10,011,134,940	9,767,677,124	9,561,119,928	9,753,333,023
Total for All TRI Chemicals		10,524,649,584	10,583,928,051	10,426,058,390	10,199,031,640	10,423,301,113

⑩ Data from 1991 as reported on 1992 forms; all other years from 1993 forms.

Table 7. Quantity of 33/50 Chemicals Released/Disposed of, by Chemical, 1991-1995.²⁰

CAS Number	Chemical	1991 Quantity Released/ Disposed of Pounds	1992 Quantity Released/ Disposed of Pounds	1993 Quantity Released/ Disposed of Pounds	Projected Data	
					1994 Quantity Released/ Disposed of Pounds	1995 Quantity Released/ Disposed of Pounds
71-43-2	Benzene	18,515,198	13,435,686	11,218,310	10,156,862	9,514,913
56-23-5	Carbon tetrachloride	1,492,508	2,203,795	2,352,503	1,750,112	1,640,568
67-66-3	Chloroform	20,457,275	17,159,852	14,413,609	12,864,728	11,720,062
75-09-2	Dichloromethane	79,805,530	75,982,689	66,718,011	56,898,915	50,879,972
78-93-3	Methyl ethyl ketone	101,617,718	90,299,687	85,805,403	77,421,299	72,864,907
108-10-1	Methyl isobutyl ketone	26,212,313	24,780,173	25,426,035	24,640,846	22,332,776
127-18-4	Tetrachloroethylene	15,425,167	11,493,032	11,651,832	9,245,692	7,859,261
108-88-3	Toluene	195,627,939	198,040,224	181,399,292	159,256,140	148,151,574
71-55-6	1,1,1-Trichloroethane	127,354,830	95,687,254	64,594,783	39,984,432	21,976,845
79-01-6	Trichloroethylene	32,112,823	28,507,688	29,884,219	27,343,971	21,530,172
	Xylenes	121,722,576	115,834,532	119,799,283	113,373,997	110,218,335
	Cadmium and cadmium compounds	1,066,365	529,372	3,306,540	3,871,866	3,823,767
	Chromium and chromium compounds	40,887,764	36,968,850	53,501,023	42,258,883	40,370,441
	Cyanide compounds	6,985,338	7,276,639	6,400,402	6,633,527	11,424,295
	Lead and lead compounds	34,616,771	32,516,338	34,043,402	31,093,663	32,150,236
	Mercury and mercury compounds	83,239	229,385	57,137	45,488	42,428
	Nickel and nickel compounds	11,296,529	9,697,929	20,150,543	8,224,570	11,487,678
Total for 33/50 Chemicals		835,279,883	760,643,125	730,722,327	625,064,991	577,988,230
Total for All Other TRI Chemicals		2,694,482,413	2,592,535,523	2,475,640,489	2,125,777,458	2,080,818,171
Total for All TRI Chemicals		3,529,762,296	3,353,178,648	3,206,362,816	2,750,842,449	2,658,806,401

Table 8. Total Quantity of 33/50 Chemicals in Production-Related Waste, by Chemical, 1991-1995.²⁰

CAS Number	Chemical	1991 Total Production- Related Waste Pounds	1992 Total Production- Related Waste Pounds	1993 Total Production- Related Waste Pounds	Projected Data	
					1994 Total Production- Related Waste Pounds	1995 Total Production- Related Waste Pounds
71-43-2	Benzene	261,209,884	142,058,459	140,756,940	132,059,263	134,788,632
56-23-5	Carbon tetrachloride	32,991,083	32,082,820	25,893,111	25,611,488	24,361,675
67-66-3	Chloroform	60,003,103	55,004,049	53,346,732	51,807,094	49,792,869
75-09-2	Dichloromethane	235,057,159	237,859,664	225,747,685	188,832,421	188,237,518
78-93-3	Methyl ethyl ketone	453,195,879	469,068,465	484,785,455	480,461,184	623,585,334
108-10-1	Methyl isobutyl ketone	218,373,523	167,852,758	164,765,981	161,888,966	158,907,033
127-18-4	Tetrachloroethylene	145,897,845	119,789,553	125,631,592	113,474,714	106,470,434
108-88-3	Toluene	1,275,006,091	1,781,128,287	1,887,778,134	1,795,413,049	1,821,378,601
71-55-6	1,1,1-Trichloroethane	358,778,185	291,125,648	202,884,825	150,875,841	114,747,730
79-01-6	Trichloroethylene	269,138,057	337,283,643	341,318,197	315,024,654	217,760,993
	Xylenes	606,124,547	626,293,160	671,346,112	672,356,372	699,967,628
	Cadmium and cadmium compounds	7,378,018	15,061,880	9,875,945	10,481,127	10,797,482
	Chromium and chromium compounds	246,025,002	303,689,850	365,061,662	342,331,711	356,808,555
	Cyanide compounds	51,958,234	55,642,739	53,336,645	54,678,348	61,712,140
	Lead and lead compounds	1,149,473,922	1,041,138,818	1,055,246,376	954,467,669	889,612,923
	Mercury and mercury compounds	1,354,259	1,918,489	14,095,993	14,408,768	14,140,663
	Nickel and nickel compounds	143,613,922	145,433,703	167,799,186	177,022,288	192,415,265
Total for 33/50 Chemicals		5,515,578,713	5,822,431,985	5,989,670,571	5,641,194,957	5,665,485,475
Total for All Other TRI Chemicals		27,239,462,028	27,062,076,35	27,508,791,899	27,806,339,673	28,321,019,790
Total for All TRI Chemicals		32,755,040,741	32,884,508,20	33,498,461,670	33,447,534,630	33,986,505,265

²⁰ Data from 1991 as reported on 1992 forms; all other years from 1993 forms.



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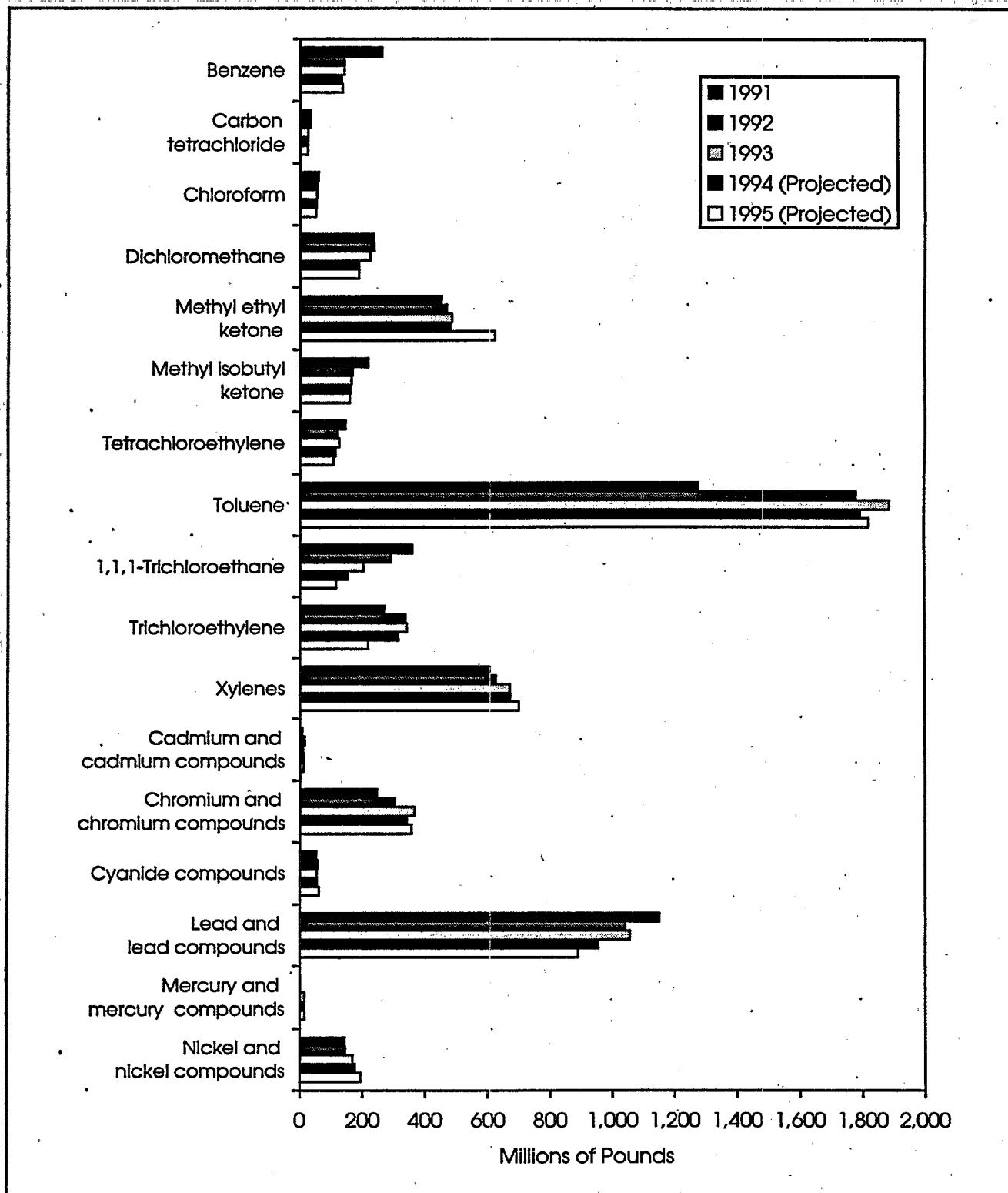


Figure 12. Total Production-Related Waste, 33/50 Program Chemicals, Actual and Projected, 1991-1995. (2)

(2) A reporting error by one facility resulted in on-site recycling of mercury being overstated by nearly 13 million pounds for 1993, 1994, and 1995. At the time this error was detected, it was too late to correct the tables and figures.

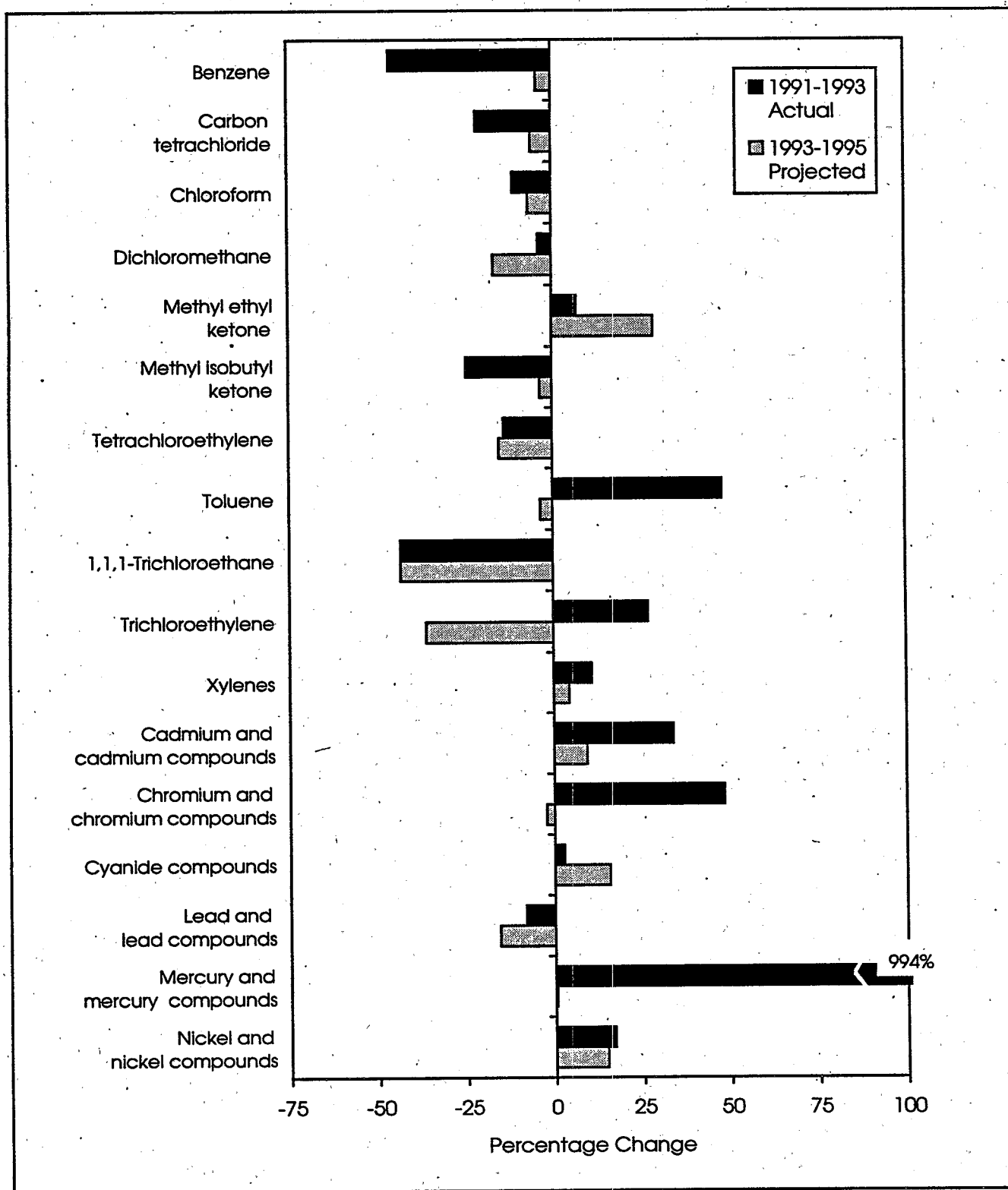


Figure 13. Percentage Change in Total Production-Related Waste, 33/50 Program Chemicals, Actual and Projected, 1991-1995.②

② A reporting error by one facility resulted in on-site recycling of mercury being overstated by nearly 13 million pounds for 1993, 1994, and 1995. At the time this error was detected, it was too late to correct the tables and figures.



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releases and transfers observed in Figure 7, particularly for the organic chemicals, did not result from source reduction measures.

Facilities are projecting that total production-related waste will decrease significantly from 1993 to 1995 for four chemicals: lead and compounds (166 million pounds), trichloroethylene (124 million pounds), 1,1,1-trichloroethane (88 million pounds), and toluene (66 million pounds). Total production-related waste of dichloromethane and of tetrachloroethylene is also projected to decrease significantly on a percentage basis during this time period. Total production-related waste is also projected to decrease by smaller quantities/percentages for five other chemicals.

Total production-related waste is projected to increase for six chemicals, most notably, methyl ethyl ketone, which is projected to increase by 139 million pounds (29%). Total production-related waste of cyanide compounds and nickel and nickel compounds is also projected to increase by 16% and 15% respectively.

Figure 14 shows the total production-related waste for 1991 to 1995 by management method. Data for 1991 through 1993 represent actual figures, while data for 1994 and 1995 represent facility projections. 1991 figures are drawn from 1992 prior year reports; all others are from 1993 reports. Figure 15 shows these data, in terms of the percent change for the periods 1991-1993 (observed changes) and 1993-1995 (projected change).

From 1991 to 1993, on-site releases and off-site disposal of 33/50 chemicals decreased by nearly 105 million pounds (12.5%). These decreases were offset by increases in all other waste management methods, most notably on-site recycling which increased by over 327 million pounds (12%) and on-site treatment which increased by 145 million pounds (34%).

Facilities are projecting that, from 1993 to 1995, on-site releases and off-site disposal of 33/50 Program chemicals will continue to decrease by 153 million pounds (21%) and on-site recycling will decrease by 331 million pounds (11%). Only on-site energy recovery is projected to increase significantly (189 million pounds, 26%).

In comparison, on- and off-site recycling of non-33/50 chemicals increased from 1991 to 1993 by over 666 million pounds (7%) and 309 million pounds (13%) respectively. On- and off-site recycling is projected to continue to increase from 1993 to 1995 (8% and 9% respectively). Quantities released are expected to decrease by 16% from 1993 to 1995. On-site energy recovery of non-33/50 chemicals decreased 11% from 1991 to 1993 while off-site energy recovery increased by 13%. On-site energy recovery is expected to increase by 8% from 1993 to 1995 while off-site energy recovery is expected to decrease by 14% during this time period.

SOURCE REDUCTION REPORTING FOR 33/50 PROGRAM CHEMICALS

Facilities are also required to report in Section 8 of Form R any source reduction efforts that were directed toward TRI chemicals during the reporting year and the methods they employed in identifying source reduction opportunities.

Source Reduction Activities

Table 9 summarizes facility reporting of source reduction activities for each of the 17 33/50 Program chemicals for 1991-1993. As a group and individually, 33/50 Program chemicals evidenced higher rates and levels of source reduction activity reporting than other TRI chemicals. Of the more than 19,700

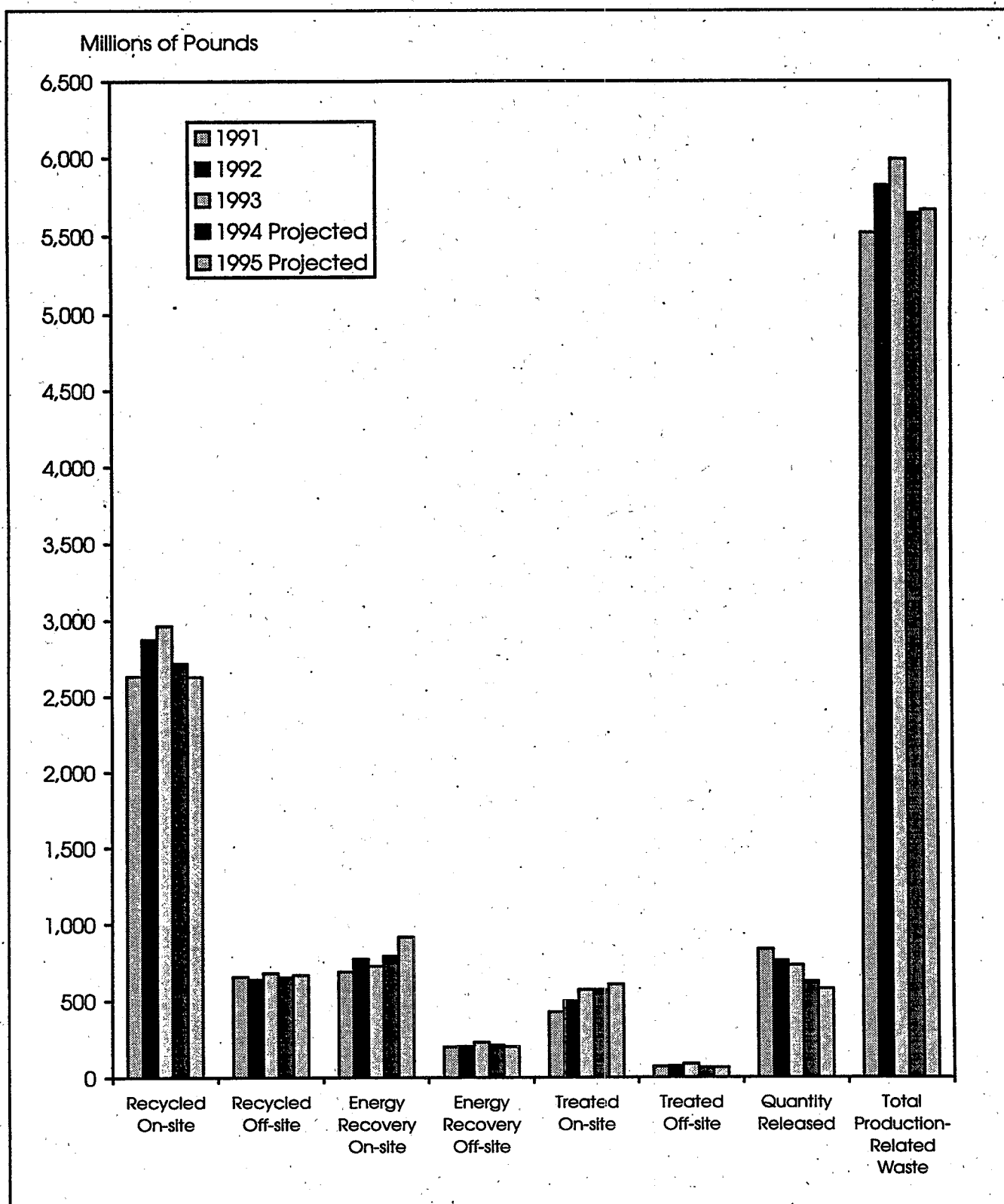


Figure 14. TRI Data Collected Under the Pollution Prevention Act for 33/50 Program Chemicals, by Management Type, Actual and Projected, 1991-1995.



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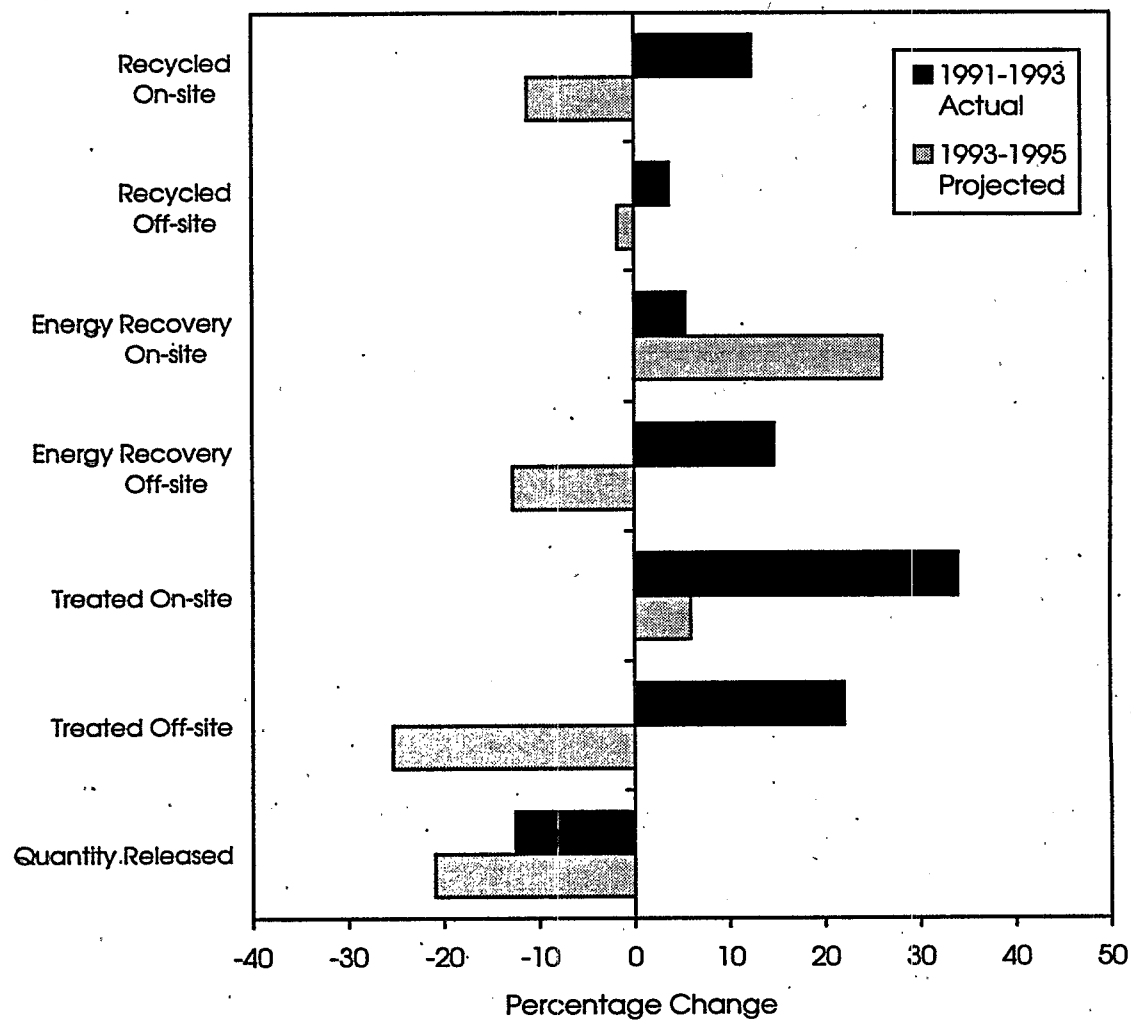


Figure 15. Percentage Change in Waste Management Practices, 33/50 Program Chemicals, 1988-1993.



Table 9. Number of TRI Forms Reporting Source Reduction Activity, by 33/50 Program Chemical, 1991-1993.

CAS Number	Chemical	Forms Reporting Source Reduction Activities								
		Number of TRI Forms			Number			Percent of All Forms		
		1991	1992	1993	1991	1992	1993	1991	1992	1993
71-43-2	Benzene	486	474	469	156	154	143	32.1	32.5	30.5
56-23-5	Carbon tetrachloride	102	90	74	29	27	18	28.4	30.0	24.3
67-66-3	Chloroform	183	180	175	67	62	54	36.6	34.4	30.9
75-09-2	Dichloromethane	1,293	1,131	1,065	524	419	380	40.5	37.0	35.7
78-93-3	Methyl ethyl ketone	2,570	2,481	2,418	970	911	904	37.7	36.7	37.4
108-10-1	Methyl isobutyl ketone	1,041	1,027	1,006	385	360	338	37.0	35.1	33.6
127-18-4	Tetrachloroethylene	573	512	474	215	191	175	37.5	37.3	36.9
108-88-3	Toluene	3,928	3,770	3,569	1,501	1,443	1,376	38.2	38.3	38.6
71-55-6	1,1,1-Trichloroethane	3,699	3,178	2,073	1,616	1,494	1,154	43.7	47.0	55.7
79-01-6	Trichloroethylene	723	675	772	291	248	285	40.2	36.7	36.9
	Xylenes	3790	3650	3,562	1368	1318	1,281	36.1	36.1	36.0
	Cadmium	217	186	177	61	64	63	28.1	34.4	35.6
	and cadmium compounds									
	Chromium	3054	3045	3,107	602	565	567	19.7	18.6	18.2
	and chromium compounds									
	Cyanide compounds	313	293	292	93	86	78	29.7	29.4	26.7
	Lead and lead compounds	1803	1689	1,655	486	442	427	27.0	26.2	25.8
	Mercury	56	39	35	12	8	10	21.4	20.5	28.6
	and mercury compounds									
	Nickel and nickel compounds	2369	2380	2,459	379	352	386	16.0	14.8	15.7
	Total for 33/50 Chemicals	26,200	24,800	23,382	8,755	8,144	7,639	33.4	32.8	32.7
	Total for All Other TRI Chemicals	58,591	57,473	56,605	12,995	12,508	12,093	22.2	21.8	21.4
	Total for All TRI Chemicals	84,791	82,273	79,987	21,750	20,652	19,732	25.7	25.1	24.7

Form Rs reporting that a source reduction activity was implemented during 1993, nearly 40% (7,639) were for the 17 33/50 Program chemicals, even though Program chemicals account for only 30% of total TRI Form Rs. One-third of the Form Rs for 33/50 Program chemicals reported the occurrence of source reduction, compared to slightly more than one-fifth of the forms for other TRI chemicals.

Individual 33/50 Program chemicals had some of the highest rates of reporting on source reduction. Four of the five TRI chemicals with the greatest number of Form Rs reporting source reduction are 33/50 Program chemicals [toluene, xylene (mixed isomers), 1,1,1-trichloroethane, and methyl ethyl ketone]. The high ranking for 33/50 Program chemicals is partially due to the fact that they rank among the highest TRI chemicals in total number of Form Rs

submitted, but they also evidenced some of the highest percentages of Form R submissions indicating source reduction. Among 33/50 Program chemicals, the highest was 1,1,1-trichloroethane, with 56% of its TRI forms indicating source reduction activity.

Twelve 33/50 Program chemicals are among the top 50 TRI chemicals for numbers of forms reporting source reduction. Of these, organic chemicals generally evidenced higher percentages of Form Rs reporting source reduction than did the metals, ranging from 24% to 56% for the eleven organic chemicals and from 16% to 36% for the metals.

For the period 1991-1993, source reduction activity reporting has declined both in absolute terms, due mostly to reductions in total Form Rs submitted to TRI, and in percentage terms,



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Table 10. Number of TRI Forms Reporting Source Reduction Activity, by Category, by Chemical, 1993.

CAS Number	Chemical	Forms Reporting per Category of Source Reduction Activity						
		Good Operating Practices Number	Inventory Control Number	Spill and Leak Prevention Number	Raw Material Modifications Number	Process Modifications Number	Cleaning and Degreasing Number	Surface Preparation and Finishing Number
71-43-2	Benzene	64	7	106	9	84	7	2
56-23-5	Carbon tetrachloride	6	1	6	3	9	1	0
67-66-3	Chloroform	13	1	11	19	39	0	0
75-09-2	Dichloromethane	164	34	96	113	117	89	21
78-93-3	Methyl ethyl ketone	448	161	160	239	262	111	268
108-10-1	Methyl isobutyl ketone	181	57	69	73	124	35	100
127-18-4	Tetrachloroethylene	94	10	44	23	43	59	5
108-88-3	Toluene	648	198	304	364	404	132	426
71-55-6	1,1,1-Trichloroethane	350	66	106	361	183	579	104
79-01-6	Trichloroethylene	128	16	50	18	56	178	6
	Xylenes	584	182	281	287	380	104	464
	Cadmium and cadmium compounds	19	6	14	25	28	2	1
	Chromium and chromium compounds	302	76	137	115	219	39	24
	Cyanide compounds	29	9	10	10	50	15	1
	Lead and lead compounds	216	55	93	132	175	8	9
	Mercury and mercury compounds	1	0	0	3	6	0	0
	Nickel and nickel compounds	221	63	75	55	166	34	14
Total for 33/50 Chemicals		3,468	942	1,562	1,849	2,345	1,393	1,445
Total for All Other TRI Chemicals		6,108	1,507	4,039	1,989	4,729	1,002	872
Total for All TRI Chemicals		9,576	2,449	5,601	3,838	7,074	2,395	2,317

though only marginally (1% from 1991-1993).

Similar patterns are observed for both 33/50 and non-33/50 Program chemicals.

Facilities described the type of source reduction activity that they implemented for each chemical (see Table 10). 33/50 Program chemicals as a group did not differ significantly from other TRI chemicals in the types of activities employed. Improvement in facility operating practices is the most common approach.

Methods Used to Identify Source Reduction Opportunities

Table 11 summarizes facility reporting of source reduction activity identification methods for each of the 17 33/50 Program chemicals in 1993. Here again, facilities did not seem to treat Program chemicals differently than other TRI chemicals in their search for source reduction opportunities, although the data do show a somewhat greater reliance on assistance from federal programs, industry associations, and vendors in the case of 33/50 Program chemicals compared to other TRI chemicals.



LOOKING TO THE FUTURE: AN AGENDA FOR ACTION

Many people think that the 33/50 Program ends at the end of 1995, since its ultimate national 50% reduction goal is targeted for 1995. However, public release of 1995 TRI data, used to monitor companies' and the Program's progress in meeting our goals, will not occur until the spring of 1997. Accordingly, EPA's administration of the 33/50 Program will continue well beyond 1995, guided by an ambitious agenda.

Recognizing Companies' 33/50 Program Achievements

EPA offers public recognition to companies to encourage them to participate in the 33/50 Program and to undertake pollution reduction activities. All participants receive Certificates of Appreciation upon enrollment. Last year, in conjunction with the announcement that the Program's 1992 interim 33% reduction goal had been exceeded by nearly 100 million pounds, more than 300 companies were singled out to receive Certificates of Environmental Achievement for reducing releases and transfers of Program chemicals either by 100% or by more than 1 million pounds.

As the Program approaches its ultimate 50% reduction goal, the Agency is assessing options for commending companies for their reduction achievements. One option is to recognize all companies that achieve their own written reduction pledges. Another is to single out companies that achieve substantial reductions. A major concern that has been raised regarding both of these options is that TRI does not explain whether reductions are the result of real changes in facility operations (vs. changes in release estimating procedures, plant closures, etc.) nor how real reductions were achieved.

Addressing such concerns may require EPA to verify reductions in conjunction with recognizing company 33/50 Program achievements.

33/50 Program Awards

EPA is working with a panel of representatives from industry, states, and environmental groups to determine whether 33/50 Program Awards should be issued to a select set of companies whose pollution reduction achievements could be considered truly remarkable. Concerns have been raised, however, that such a selection process might unfairly stigmatize those companies not receiving the awards. Other concerns address the issue of reviewing and verifying award nominations.

One idea being considered by this panel is to encourage companies to submit 33/50 program Success Stories detailing the ways in which they achieved significant reductions in emissions of the target chemicals. Such Success Stories could be reviewed and distributed by EPA, providing a wealth of "how-to" information for other companies to draw on in reducing their own wastes. EPA has already produced a series of 33/50 Program Company Reduction Profiles, and more are scheduled for release this spring. However, asking companies to nominate their own Success Stories for recognition by EPA would broaden substantially the coverage of this information.

These and other recognition options are being explored. Recognition of some type will be made at a major 33/50 Program Conference timed to celebrate achievement of the Program's 50% reduction goal.

Decisions on categories, criteria, and nomination procedures will be announced in the summer of 1995.



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Table 11. Methods Used to Identify Source Reduction Activity, by 33/50 Program Chemical, 1993.

CAS Number	Chemical	Forms Reporting Source Reduction Activities Number	Pollution Prevention Opportunity Audit		Materials Balance Audit Number	Participative Team Management Number	Employee Recommendation	
			Internal Number	External Number			Informal Number	Formal Program Number
71-43-2	Benzene	143	79	9	12	44	23	24
56-23-5	Carbon tetrachloride	18	7	0	2	4	2	3
67-66-3	Chloroform	54	15	2	5	27	6	6
75-09-2	Dichloromethane	380	146	17	46	171	73	36
78-93-3	Methyl ethyl ketone	904	326	49	147	440	171	100
108-10-1	Methyl isobutyl ketone	338	134	21	48	174	64	47
127-18-4	Tetrachloroethylene	175	82	9	26	77	30	15
108-88-3	Toluene	1,376	515	65	180	621	234	149
71-55-6	1,1,1-Trichloroethane	1,154	444	58	108	515	149	105
79-01-6	Trichloroethylene	285	118	21	36	125	49	22
	Xylenes	1,281	483	55	152	561	229	154
	Cadmium and cadmium compounds	63	25	2	10	25	8	10
	Chromium and chromium compounds	567	215	28	97	295	100	65
	Cyanide compounds	78	35	2	9	38	15	2
	Lead and lead compounds	427	168	29	53	223	85	44
	Mercury and mercury compounds	10	3	2	1	5	1	3
	Nickel and nickel compounds	386	130	14	72	218	79	34
Total for 33/50 Chemicals		7,639	2,925	383	1,004	3,563	1,318	819
Total for All Other TRI Chemicals		12,093	4,788	536	1,568	5,791	2,177	1,326
Total for All TRI Chemicals		19,732	7,713	919	2,572	9,354	3,495	2,145

33/50—The Next Generation

As calendar year 1995—the 33/50 Program's final year—proceeds, EPA increasingly is being asked what, if anything, it plans to do as a follow-up. A general consensus has emerged that voluntary partnerships between government and industry can be effective in promoting pollution prevention. However, perspectives differ on both the need for and the design of a next generation of the 33/50 Program.

EPA has been spearheading public discussion on the prospects for a next generation voluntary program. The objective is to obtain input from industry, environmental groups, citizens, states, and other constituencies on two basic questions:

- Should there be a next generation of the 33/50 Program?

- How should a next-generation 33/50 Program be designed?

This decision-making process will conclude with a formal announcement in the summer of 1995.

Call for Comments

Anyone interested in offering suggestions or commenting on company recognition options, 33/50 Program Awards, or prospects for a next-generation voluntary environmental partnership program is encouraged to call or write the 33/50 Program staff at the phone numbers and addresses provided at the end of this report.



Table 11.

Chemical	State Program Number	Federal Program Number	Trade/ Industry Program Number	Vendor Assistance Number	Other Number
Benzene	2	1	9	17	56
Carbon tetrachloride	0	0	1	0	7
Chloroform	0	0	3	4	21
Dichloromethane	2	1	16	90	84
Methyl ethyl ketone	17	1	63	311	159
Methyl isobutyl ketone	7	0	20	102	60
Tetrachloroethylene	4	0	13	50	29
Toluene	23	5	101	501	273
1,1,1-Trichloroethane	19	17	85	417	241
Trichloroethylene	9	0	13	77	51
Xylenes	26	4	92	466	256
Cadmium and cadmium compounds	0	0	3	13	20
Chromium and chromium compounds	5	1	29	134	96
Cyanide compounds	1	0	5	26	10
Lead and lead compounds	3	1	30	91	107
Mercury and mercury compounds	0	0	0	0	1
Nickel and nickel compounds	3	1	20	65	73
Total for 33/50 Chemicals	121	32	503	2,364	1,544
Total for All Other TRI Chemicals	138	40	686	2,652	2,372
Total for All TRI Chemicals	259	72	1,189	5,016	3,916



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FOR MORE INFORMATION . . .

Companies' written communications with the 33/50 Program are available to the public along with a variety of Program information materials, including computer-generated lists of participating companies. Anyone interested in obtaining additional information about the 33/50 Program can do so by calling EPA's TSCA Assistance Hotline at (202) 554-1404 Monday through Friday between 8:30 a.m. and 5:00 p.m.

US EPA - Region I

(MS: ATR)
1 Congress Street
Boston, MA 02203
PH#: (617) 565-4502
FAX: (617) 565-4939

US EPA - Region II

(MS: 105)
2890 Woodbridge Ave, Bldg. 10
Edison, NJ 08837
PH#: (908) 906-6815
FAX: (908) 321-6788

US EPA - Region III

(MS: 3AT01)
841 Chestnut Bldg
Philadelphia, PA 19107
PH#: (215) 597-9302
FAX: (215) 580-2011

US EPA - Region IV

345 Courtland Street, NE
Atlanta, GA 30365
PH#: (404) 347-1033
FAX: (404) 347-1681

US EPA - Region V

(MS: SP-14J)
77 W. Jackson Blvd.
Chicago, IL 60604
PH#: (312) 886-6219
FAX: (312) 353-4342

EST. Or contact the 33/50 Program staff directly at EPA headquarters at (202) 260-6907 or by directing letters to Mail Code 7408, Office of Pollution Prevention and Toxics, U.S. EPA, 401 M Street, SW., Washington, DC 20460. Program staff can also be reached via fax at (202) 401-8142, or via the Internet at BURNS.MIKE@EPAMAIL.EPA.GOV. Information about the 33/50 Program can also be obtained from 33/50 Program Coordinators in EPA's 10 Regional Offices:

US EPA - Region VI

(MS: 6T-PT)
1445 Ross Avenue
Dallas, TX 75202
PH#: (214) 665-7582
FAX: (214) 665-2164

US EPA - Region VII

(MS: ARTX)
726 Minnesota Avenue
Kansas City, KS 66101
PH#: (913) 551-7315
FAX: (913) 551-7065

US EPA - Region VIII

(MS: 8ART-AP)
999 - 18th St., Suite 600
Denver, CO 80202-2405
PH#: (303) 294-7684
FAX: (303) 293-1229

US EPA - Region IX

(MS: A-4-3)
75 Hawthorne Street
San Francisco, CA 94105
PH#: (415) 744-1061
FAX: (415) 744-1073

US EPA - Region X

(MS: AT-083)
1200 - 6th Avenue
Seattle, WA 98101
PH#: (206) 553-4762
FAX: (206) 553-8338